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FLINT CHIPS.

A Guide

TO

PRE-HISTORIC ARCHÆOLOGY,

AS ILLUSTRATED BY

THE COLLECTION IN THE BLACKMORE MUSEUM,
SALISBURY;

BY

EDWARD T. STEVENS,

Hon. Curator of the Blackmore Museum.

"Time which antiquates antiquities, and hath an art to make dust of all things, hath yet spared these minor monuments."—*Sir Thomas Browne.*

LONDON:
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PREFACE.

About twelve months since I undertook, at Mr. Blackmore's request, the preparation of a Descriptive Catalogue of the contents of the Blackmore Museum, at Salisbury; little imagining, at the time, that it would lead to the publication of the present volume. In collecting materials for a much smaller book, however, the matter contained in "Flint Chips" was brought together. As the work advanced I became interested in one branch of the subject after another,

> "And so I penned
> It down, until at last it came to be,
> For length and breadth, the bigness which you see."

"Flint Chips" has been written at odd moments, and amid the constant interruptions of business. I fear, therefore, that not a few errors may have escaped detection; but I trust that these will not prove to be of scientific importance. Let me add, that I am unacquainted with the art of book-making: indeed, I have not attempted to write a book, but merely to impart the little I have learnt with regard to a special subject, for the benefit of those, who may chance to know less about it than myself.

As far as possible, the sources from whence my information has been obtained are mentioned, chiefly in order that the statements may rest upon higher authority than my own.

A considerable portion of "Flint Chips" was printed before the second edition of Sir John Lubbock's "Prehistoric Times" was published. In order to prevent confusion, therefore, all the references to that book in the present work are to the first edition.

In mentioning any of the Indian tribes of North America, I have, in nearly every instance, adopted the spelling of the names as given by Drake,* solely for the sake of uniformity, and not with the idea of determining the correct spelling, or with the view of criticising the authors quoted.

I have endeavoured to make "Flint Chips" a record of facts, rather than an exposition of speculative theories. Nevertheless, I would not be understood to mean that I hold no definite general views upon the subject of Prehistoric Archæology, or that no digested plan has been adopted in the arrangement of the Blackmore Collection. The founder, Mr. Blackmore, in his excellent address at the opening of the Museum,† expressly said that "the one great lesson which I conceive to be taught by my Collection is *progress*."

This *progress* may have been retarded, or arrested, in the case of some savage tribes; but even the most degraded savages possess weapons and implements which afford evidence of thought, of contrivance, and of invention. That many of these inventions are their own, and were not received by transmission from others, seems to be proved by the frequent occurrence of special forms of weapons and implements which are peculiar to the particular tribes who use them. And, as it has been well expressed by Colonel Lane Fox,‡ "we come to look upon even the most barbarous state of man's existence

* 'Book of the Indians,' Eleventh Edition, Boston, 1857. See list of the Indian Tribes, pp. 9—16.

† September 5, 1867.

‡ 'Primitive Warfare,' in 'Journ. Roy. United Service Inst.,' Dec., 1867.

as a condition not so much of degradation as of arrested or retarded *progress*, and to see that, notwithstanding many halts and relapses, and a very varied rate of movement in the different races, the march of human intellect has been always onward."

The very idea of *progress*, however, implies a commencement, a starting-point; and, probably, the chipped flint implements found in the valley-gravels furnish us with this starting-point of human thought and invention. Although many of these implements are extremely rude, yet, even the rudest afford evidence of human thought and of the adaptation of means to an end. As a tool-and-weapon-using being, man stands alone; "in no case whatever," says the Duke of Argyll,* "do the lower animals use an implement made by themselves, as an intermediate agency between their bodily organs and the work which they desire to do. Man, on the contrary, is so constructed, that in almost everything he desires to do, he must employ an agency intermediate between his bodily organs and the effect which he wishes to produce. But this necessity, which in one aspect is a physical disability, is correlated with a mind capable of invention, and with certain implanted instincts, which involve all the rudiments of mechanical skill. The man, who first lifted a stone and threw it, practised an art, which, in all probability, is as strictly instinctive and natural to man, as it is to a dog to bite, or to a bull to charge. The act involves the idea and the knowledge of projectile force, and of the arts by which direction can be given to that force. The wielding of a stick is, perhaps, an act of equally primitive intuition, and from this to the throwing of a stick, and the use of javelins, is an easy and natural transition. Simple as these acts are, they involve both physical and mental powers, capable of all the developments which we see in the most

* 'Primeval Man,' pp. 144—149.

advanced industrial arts. These acts involve the instinctive idea of the constancy of natural causes, and the capacity of thought which gives man the conviction that what has happened under given conditions will, under the same conditions, always happen again." With man "thought was an instinct, and contrivance was at once a necessity and a delight," and in this lies the immeasurable distance between man and the lower animals.

The development of civilization, however, is not uniform, although, "to a certain extent, human culture does progress consistently; and evidence as to the condition of one of its departments really does authorise, in some measure, an opinion as to its condition as a whole."*

The following pages are devoted to a general consideration of the Stone Age, so far as it is illustrated by the Collection in the Blackmore Museum; and, during this period, abundant evidence of *progress* is shown in the manufacture of stone implements, in reference to which Mr. John Evans has made the following remarks:—"I can hardly quit the subject without just mentioning that here, as elsewhere, we find traces of improvement and *progress*, both in adapting forms to the ends they had to subserve, and in the manner of treating the stubborn materials of which these stone implements were made. Such *progress* may not have been, and probably was not, uniform even in any one country, and, indeed, there are breaks in the chronology of stone implements which it is hard to fill up; but anyone comparing, for instance, the exquisitely-made axe-hammers and delicately-chipped flint arrow-heads of the Bronze age with the rude implements of the Palæolithic period, cannot but perceive the advance that had been made in skill and adaptation of

* E. B. Tylor, 'Condition of Prehist. Races, as inferred from Observations of Modern Tribes,' in 'Trans. International Congress Prehist. Archæol.,' 1868, p. 11.

means to end. Dividing the lapse of time embraced between these two extremes into four periods, we find:—

"1. That in the Palæolithic, or River-gravel Drift Period, implements were fashioned by chipping only, and were not ground or polished. The material used was, moreover, as far as at present known, almost exclusively flint.

"2. That in the Reindeer, or Cavern, Period of Central France, though grinding was not practised, yet greater skill in flaking flint, and in working up flakes into serviceable tools, was exhibited. In some places, as at Laugerie, surface chipping is found on the flint arrow-heads, and recesses have been worked in other hard stones than flint, though no other stones have been used for cutting purposes.

"3. That in the Neolithic, or Surface Stone, Period of Western Europe, other materials beside flint were used for the manufacture of hatchets. Grinding on the edge and on the surface were generally practised, and the art of working flint by pressure from the edge was probably known. The stone axes, at least in Britain, were rarely perforated.

"4. That in the Bronze Period such stone implements as remained in use were, as a rule, highly finished, many of the axes being perforated and of graceful form, and some of the flint arrow-heads evincing the highest degree of manual skill."*

Evidence of *progress* in prehistoric times is not limited to the improvement shown in the manufacture of implements; it extends also to the indications, afforded by these objects, of

* Evans 'On the Manufacture of Stone Implements in Prehist. Times,' in 'Trans. International Congress Prehist. Archæol,' 1868, p 193.

the introduction of new habits of life; such, for instance, as the practice of agriculture and the use of cereals for food.

Considered in reference to *progress*, perhaps the greatest discovery of prehistoric times was the knowledge that certain kinds of grain were nutritious, and that by cultivating them a constant supply of food could be obtained. Up to this point, the hunter had been compelled to follow the wild animals in their migrations; the nomad to seek fresh pastures for his flocks and herds; whilst the uncertain supply of food, often resulting in positive famine, limited the number of individuals, who *could* subsist in a company.

With the introduction of agriculture all this was changed; a more settled mode of life was adopted, and men were enabled to congregate in particular spots without risk of starvation; this naturally led to the sub-division of labour, to the establishment of commerce, and to a general advance in civilization.

Up to the present time there is no evidence to show that men of the earliest (Palæolithic) period practised agriculture; neither do they seem to have domesticated any of the wild animals. They appear to have subsisted, exclusively, by hunting.

The cultivation of cereals for food seems to have arisen, independently, in the Old World and in America.

After this first step towards a settled mode of life was taken, we find evidence of *progress* in the implements used for grinding corn. The Neolithic folk in the Old World at first appear to have reduced grain to a coarse powder by rubbing it upon slabs of stone (saddle-shaped mealing stones), or by bruising it in shallow stone mortars. Subsequently they invented the "quern," which consists of two stones, the upper being made to revolve upon the lower; this quern was, even in its simplest form, an improvement upon the ruder mealing-stones which preceded it. As time rolled on, the quern underwent many changes, but even the modern corn-mill is no more than an

adaptation of the ancient quern. *Progress* has not shown itself so much in altering the grinding principle, as in substituting wind, water, or steam-power, for manual labour in working the mill.

It is interesting to note, that *progress* does not move with equal rapidity, nor in one uniform direction, with different races. Thus, the American tribes discovered the use of corn for food, and practised agriculture, rendering it possible for indigenous semi-civilisation, as in Yucatan and Mexico, to arise. But they did *not* hit upon the invention of the quern; and, even at the present time, the primitive stone slab, or the stone pestle and mortar, continue in daily use in parts of America for grinding maize. Notwithstanding this, there has not been a total absence of *progress* with regard to American mealing-stones, for highly ornate forms were given to the implements; they were covered with carving, or were laboriously sculptured into the forms of men or animals.

Examined in this way, a Collection, such as that in the Blackmore Museum, is calculated to throw much light upon the *progress* of civilization in various countries, and, as this Collection has been brought together by the enterprise of a single individual, what might not be accomplished by combined national action? It has been well said that "the antiquities of a country are its public property; they are *historical facts*, which no individual has any right to monopolise to ornament his chimney-piece, or to give as toys to his children." And it is added:—"I should like to believe that the public will make use of the information they convey, in their own interest, by depositing in public collections such objects as they may discover."*

The foundation of a National Ethnological Museum exists in the Christy Collection, already the property of the nation,

* Vouga, quoted by Gastaldi, 'Prehistoric Remains in Italy,' p. 119.

through the liberality of its founder, the late Mr. Henry Christy. The development and arrangement of this very instructive museum is being most admirably carried out by Mr. Franks, and it is hoped that the public will second his efforts, by assisting him to fill up the gaps which must necessarily exist, for some time to come, in the continuity of the series in such a collection. I make a similar appeal on behalf of the Blackmore Museum. It is our desire to *improve* the "general collection," rather than to *extend* it; we seek to render it more illustrative, and more generally representative of the industry of the Stone Age of various countries. But we do not propose to limit the extension of the American and the local groups, for we wish these to become the leading features of the Collection.

The pleasing task remains of thanking those who have so kindly assisted Mr. Blackmore, Dr. Blackmore, and myself, in the preparation of the present work, and during the formation and arrangement of the Collection in the Blackmore Museum. Foremost among these are Mr. John Evans, Mr. Augustus W. Franks, Mr. J. Wickham Flower, and Mr. James Wyatt. The following pages will show how greatly I am indebted for information to Mr. Albert Way, Professor Church, Rev. E. L. Barnwell, Rev. Canon Greenwell, Rev. W. C. Lukis, Dr. Thurnam, Mr. T. Rupert Jones, and Mr. F. A. Paley, as well as to my American friends, Hon. John Russell Bartlett (Rhode Island), and Mr. John D. Sherwood (New York), who have each contributed articles upon the archæology of America.

My special thanks are due to Professor Church, for his valuable paper upon "The Materials of the Ohio Pipes," and for the time he has devoted to the examination of the specimens in the American series, the materials of which he has determined.

It should be here mentioned that, in the opinion of Professor Church, the identification of many of the rock and mineral

materials in the Blackmore Collection is tentative, rather than final. Such substances as quartz, obsidian, jade, &c., have been named with certainty; other materials, especially those of rare occurrence or foreign origin, with much doubt. The difficulties in determining the species of the less obviously intelligible rocks and minerals have been considerable. Many of the objects have been altered by weathering, fire, or special treatment of the surface; but it was, of course, not allowable to obtain a fresh fracture for minute examination, nor to detach a piece for analysis. The features of the specimens were still further obscured by *prehistoric dirt*, the removal of which would have been as sacrilegious, in the eyes of archæologists, as the removal of the patina from a bronze coin. What Professor Church has modestly termed his *guesses*, in some few instances, may have been made on somewhat slender data; but there is no reason for supposing that any serious mistakes have been made. For the above-mentioned reasons, Professor Church has preferred to employ common, and often somewhat vague, terms for many rock materials. Instead, for example, of attempting to separate the numerous rocks containing felspar and hornblende or augite into species and varieties, he has preferred to include them nearly all under the wide term—greenstone. Confessedly imperfect as the attempt made at identification is, it is surely better to try to name the various materials, instead of calling them all simply—*stone*.

I have great pleasure in expressing my gratitude to Rev. L. Gidley, Rev. J. Earle, Mr. H. J. F. Swayne, Mr. James Hussey, Mr. J. E. Nightingale, and Rev. T. Stevens, for the kindness they have shown in reading my proofs.

My best thanks are due to Mr. J. E. Lee, the translator of Dr. Keller's work upon "Lake-Dwellings," who most kindly corrected the account of these interesting relics to be found in the following pages.

I am greatly indebted to Mr. Blackmore, the Founder of the

Blackmore Museum, for his liberality in undertaking to defray the cost of the present publication.

To my friend and colleague, Dr. Blackmore, my warmest thanks are due, not only for the excellent article contributed by him to "Flint Chips," but also for his kind and constant assistance.

Much of the value of a work like the present depends upon the correctness of the illustrations. In this particular Mr. De Wilde has been most successful; his engravings are both faithful and artistic, and he has caught the very spirit and feeling of the pipe-sculptures.

The Frontispiece to "Flint Chips" is Mr. De Wilde's gift to the work, and I beg to thank him very much for this and many other acts of kindness. The objects, so faithfully represented in the Frontispiece, are among the most remarkable examples of flint-chipping in the Museum; a description of them will be found at pp. 289—291.

To Mr. Ranken I am much indebted, for his prompt business attention and care in printing the present work, for the many valuable suggestions he has made, and for his uniform and obliging kindness.

EDWARD T. STEVENS.

BLACKMORE MUSEUM,
March, 1870.

PREFACE TO THE AMERICAN EDITION.

The subject of Prehistoric Archæology is now attracting much attention in the United States, in which country some discoveries have lately been made tending to prove that the human race here, no less than in Europe, was contemporary with the mastodon and other extinct animals.

At the late meeting of the American Association for the Advancement of Science, several papers were read, giving the particulars of these discoveries. These papers have not yet been printed: hence, it is not possible to state with accuracy what additional light recent research has thrown upon prehistoric times in America.

In 1867, the American Antiquarian Society appointed the Hon. J. Lothrop Motley, Hon. T. Bigelow Lawrence, Dr. Joseph Sargent, and myself as delegates to the International Archæological Congress, which met at Antwerp. Whilst in Europe, I availed myself of the opportunity of visiting several of the principal Continental collections illustrative of Prehistoric Archæology. And my impression is that, for purposes of comparison, the Blackmore Museum, at Salisbury, England, although not so extensive in every department as some of the Continental Museums, is nevertheless one of the best in Europe. On my return to America I expressed this opinion in a report which is

printed in the Proceedings of the American Antiquarian Society,* from which the following is an extract :—" But what adds greatly to the value of the Blackmore Collection, and which, for purposes of comparison, places it above all others, is the collection of American antiquities made by Messrs. Squier and Davis in their explorations of the tumuli and mounds of the valleys of the Mississippi and Ohio.

This was the finest Collection of its kind in the United States, and it is doubtful whether one of equal extent, and so rich in the works of primitive man in America, can again be made; indeed, many of the specimens are unique. This unrivalled Collection was offered to several of our Antiquarian and Historical Societies; but, Mr. Blackmore, being in this country, in 1863, and learning that the owner was anxious to sell it, became its purchaser. Mr. Blackmore told me that he felt very reluctant to remove the Collection from the United States, where he thought it should remain, and it was not until he had been assured that the Societies to which it had been offered had declined buying it, that he concluded to take it. The city of Salisbury can now boast of possessing, in the Blackmore Museum, the finest collection of stone implements and other objects of art of our aborigines, in the world."

JOHN RUSSELL BARTLETT.

PROVIDENCE, RHODE ISLAND,
January, 1870.

* No. 49, April 29, 1868, pp. 54, 55.

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Mr. W. Read.
Mr. Charles Rau, New York.

Mr. John Stuart, Sec. Soc. Antiq. Scot., Edinburgh.
Hon. W. Owen Stanley, M.P., Penrhos, Holyhead.
M. Waldemar Schmidt, Copenhagen.
Mr. Charles Roach Smith, Hon. M.R.S.L.
Mr. Alfred Seymour, M.P., Knoyle House.
Miss Salisbury, Brighton.

Mr. F. Stratton, Devizes.
Mr. Samuel Sharp, F.S.A.
Mr. E. G. Squier, New York.
Mr. George Sidford, Bower Chalk.
Mr. Frederick Sidford, Bishopston.
Mr. James Sidford, South Newton.
Mr. James Swayne, Bishopston (deceased).
Mr. Simpson, Melksham.
Mr. H. J. F. Swayne, Wilton.
Mr. Alfred H. Stevens.
Mr. Street, Langley.
Mr. J. W. Singer, Frome.

M. Frédéric Troyon (deceased).
Mr. Toomer, Salisbury.
Dr. Thurnam, F.R.S., Devizes.

M. T. Uhlmann, M.D., Münchenbuchsee, Switzerland.

Mr. Albert Way, M.A., F.S.A.
Mr. George Witt, F.R.S., London (deceased).
Mr. James Wyatt, F.G.S., Bedford.
Judge George W. Woodward, Wilksburn, Pennsylvania.
Mrs. Campbell Wyndham (deceased).
Mr. J. Wilmot (deceased).
Mr. W. D. Wilkes.
Mr. Charles Wansbrough, Shrewton.
Mr. Wheaton, Salisbury.
Mr. Wing.

Mr. Zillwood, Salisbury.

Rules of the Blackmore Museum.

Rule I.

This Museum shall be called the "Blackmore Museum," having been established by Mr. William Blackmore, of Liverpool and London, at whose expense solely it will be maintained.

Rule II.

The property of the Blackmore Museum shall be deposited at Salisbury, and shall be vested in Trustees for the purposes of the Museum.

Rule III.

The Blackmore Museum shall be under the management of the Committee of the Salisbury and South Wilts Museum, subject to the consent of the Blackmore Museum Trustees, to be given at each Annual Meeting of the Members of the Salisbury and South Wilts Museum.

Rule IV.

The Trustees shall have power to close the Blackmore Museum for any special purpose, upon giving twenty-four hours' notice in writing to either of the Secretaries of the Salisbury and South Wilts Museum.

Rule V.

The Committee of the Salisbury and South Wilts Museum shall not be held responsible for any claims or charges in respect of the Blackmore Museum.

Rule VI.

It shall not be competent for the Trustees to make any dividend, gift, division, or bonus in money or otherwise unto or between any of the members of the Blackmore Museum.

Rule VII.

Honorary Curators shall be appointed by the Trustees, and the arrangemen of specimens shall be left in their hands.

Rule VIII.

The Trustees shall have power to remove any objects from the Blackmore Museum, for exhibition or scientific examination, at their discretion.

Rule IX.

An Honorary Secretary (who shall also act as Librarian) shall be appointed by the Trustees, and all books, drawings, manuscripts, and communications shall be under his charge.

Rule X.

No alteration shall be made in the Rules of the Blackmore Museum except with the unanimous consent of the Trustees, and no such alteration shall be binding upon the Committee of the Salisbury and South Wilts Museum except after a month's notice given to either of the Secretaries of the same.

Rule XI.

The Blackmore Museum shall be open to the public free of charge from 10 A.M. until 4 P.M., at least three days in each week, such days to be appointed by the Committee of the Salisbury and South Wilts Museum. *

Rule XII.

The attendants are strictly prohibited from accepting any gratuity from visitors to the Museum.

(Signed)

WILLIAM BLACKMORE,
HUMPHREY PURNELL BLACKMORE, M.D.,
EDWARD THOMAS STEVENS,
} *Trustees of the Blackmore Museum.*

We approve, accept, and adopt the above Rules for the government of the Blackmore extension of the Salisbury and South Wilts Museum.

(Signed) W. K. SARUM,
President of the Salisbury and South Wilts Museum.

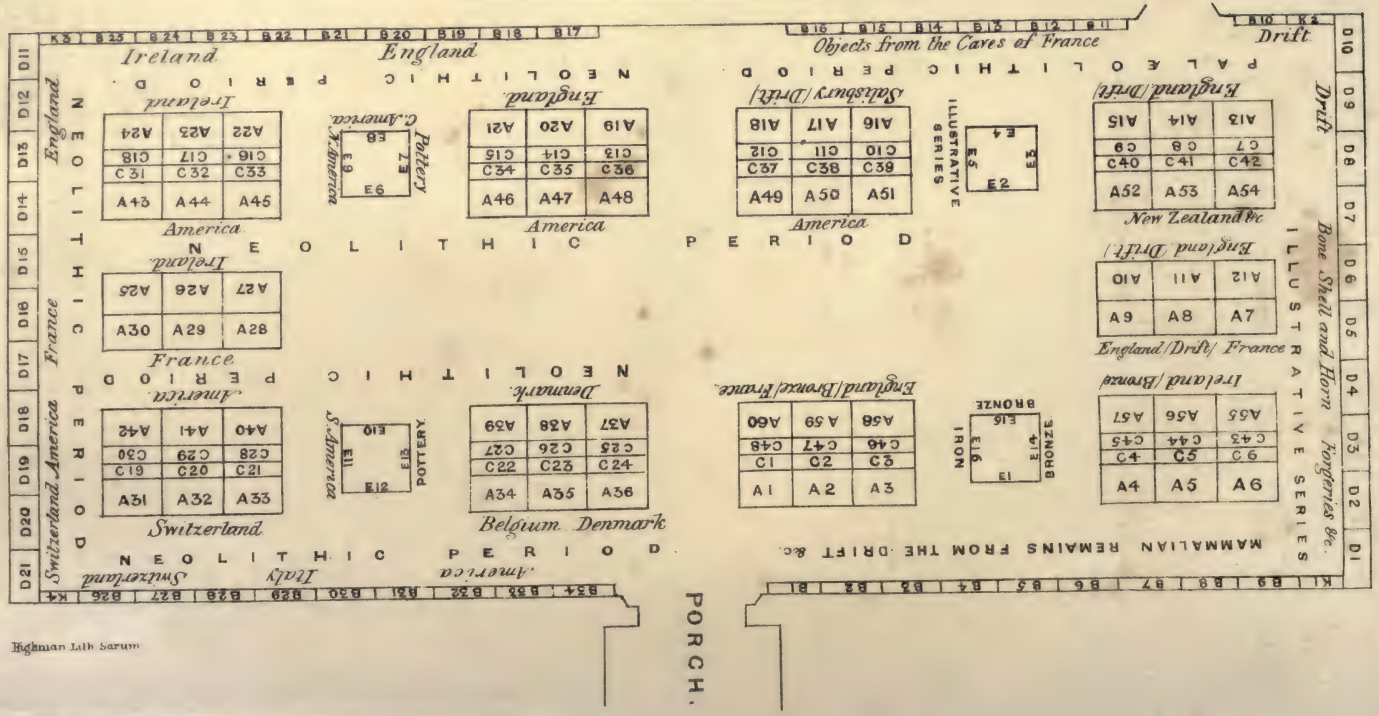
ROBT. STOKES, *Mayor.*

EDWARD DUKE,
JAMES HUSSEY,
HENRY J. F. SWAYNE,
} *Three Members of the Committee of Management of the Salisbury and South Wilts Museum.*

JAMES WILTON, JUN.
JAMES CLENCH,
} *Honorary Secretaries of the Salisbury and South Wilts Museum.*

* The Blackmore Museum may be seen daily, Sundays and Saturdays excepted.

Plan of Cases in the Blackmore Museum.



Eighman Lith Sarum

THE Collection in the Blackmore Museum is arranged in four Groups:—

GROUP I.

Remains of Animals found associated with the works of Man.

GROUP II.

Implements of Stone.

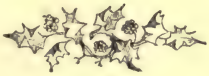
GROUP III.

Implements of Bronze.

GROUP IV.

Implements, weapons, and ornaments of Modern Savages, which serve to throw light upon the use of similar objects belonging to pre-historic times.

A general description of each group will be found in the following pages.



Drift Series.

MAMMALIAN REMAINS.

THE mammalian bones exhibited in Cases A 3, B 1 to 5, C 1, and 3, and E 1, are, with few exceptions, from the brick-fields at Fisherton, about a mile to the west of Salisbury. The clay from which they were obtained belongs to that division of the tertiary formations known as the *Mammalian drift* or *Pleistocene*.*

The gracefully sloping ranges of chalk hills which bound the river Avon, and its tributary streams, the Wily, Nadder, and Bourne, are in many places covered with detached patches of clay, sand, and gravel; in this neighbourhood they are more conveniently exposed, and of far greater extent at Fisherton than elsewhere. Here the gravel, clay, and brick earth are deposited upon the south side of the northern boundary of the river Nadder; the deposits vary considerably in thickness: in parts vertical sections show a height of about thirty feet; they everywhere gradually thin out towards the valley. At the base of the clay in some of the pits there is a very thin band of light-coloured marl, which contains a large number of land and fresh water shells, all of the species now inhabiting the streams and meadows of the present valleys.

* The terms Eocene, Miocene, Pliocene, and Pleistocene, employed by Sir Charles Lyell to designate the different tertiary strata, are derived from the Greek words ηως, dawn; μειων, less; πλειων, more; πλειστος, most; and καινος, recent,—each being intended to express the relative proportions of recent and extinct shells found in the several strata. Thus the shells of the Eocene period contain a very small number of living species, and may be looked upon as indicating the *dawn* of the existing state of the testaceous fauna. In the Pleistocene, on the other hand, all, or nearly all, the shells belong to existing species.

Bones and teeth of the animals of the period occur scattered through the clay and gravel, but they are met with chiefly a few feet from the base of the deposits. From the great lapse of time which has occurred since these bones were buried, considerable alteration in their chemical composition has taken place; nearly all trace of gelatine is lost, only the earthy salts remaining, and hence, when the bones are dry, they very readily absorb moisture, sticking to the wetted finger like a piece of dry chalk or lime; this is a rough, but often a very useful, test of the antiquity or otherwise of the remains of such animals as are still living, the ox, horse, &c.

The bones exhibited give but an imperfect idea of the state in which they usually occur; the specimens are selected from a large number, many having undergone extensive repairs; the majority are fragmentary and very much broken, although scarcely ever water-worn; it is quite the exception to meet with any of the long bones of the extremities entire.

The animals which lived in our country whilst the drift beds were being deposited, differed strangely from those with which we are now familiar, and afford the most conclusive evidence of the greatly altered condition of our climate. The musk sheep, reindeer, lemmings, pouched marmot, mammoth, and woolly rhinoceros are all animals peculiarly adapted for living in an arctic clime. Our Downs were tenanted by vast droves of rather small but hardy horses, not unlike the half-wild forest ponies of the present day, by large herds of deer, and shaggy-maned bisons. The stillness of the night, we may believe, was not unfrequently broken by the terror-inspiring roar of a hungry lion, or perchance by the howling of a pack of wolves, or the hideous discord of the savage hyænas, quarrelling over some half-putrid carcase of a young rhinoceros, making the air re-echo with their peculiar yells—that strange, half-human expression of savageness and mirth.

In examining the bones found at Fisherton, one has been forcibly struck with the fact that the same divine and beneficent law which at the present day prevents the injurious increase of any one race, obtained also at the remote period now under consideration. The too rapid extension of the *herbivora*, or vegetable feeders, was kept within proper limits by the presence of the very formidable *carnivora*, or flesh-eaters. Nor was this all, for it will be seen that amongst the former the great bulk of the bones belong either to the very young or very old individuals, in both cases indicating that it was the weak, sickly, and compara-

tively useless members that were sacrificed for the benefit of the strong and healthy.

In Case B 3 will be seen a portion of the right half of the lower jaw of the cave lion (*Felis spelæa*), with the last molar tooth *in situ*. This veritable British lion exceeded in point of size the largest African or Asiatic species of the present day. Also remains of the cave hyæna (*Hyæna spelæa*), consisting of nearly half the left half of the lower jaw, containing one incisor, the canine and three molar teeth. In this specimen we have good examples of the teeth of the great hyæna which was contemporary with the cave lion. The last molar tooth is deserving of especial notice, from its close resemblance to that of the lion above mentioned; it differs, however, in possessing two small tubercles, one at each end of the base of the crown, that on the posterior margin being the larger and better marked; this peculiar provision is very significant, as it implies another use besides that of mere flesh-dividing.

The spotted hyæna (*H. crocuta*) of the Cape, although greatly inferior in size, is the animal which most nearly resembles this extinct species. The *Hyæna crocuta* lives to a great extent upon the carcases of dead animals, breaking up the bones for the extraction of the marrow; and we consequently find that both the form of the teeth, and the unusually large and powerful muscles which work the jaw are specially adapted for this office. The stout conical teeth of the extinct hyæna exhibit also the very best form for breaking bones, as each tooth is provided at its base with a prominent collar of enamel, the use of which was evidently to protect the gum from injury by any sharp splinters of bone. Fossil remains of this extinct cave hyæna are comparatively rare in the drift, but in many of the caverns and fissures which occur in limestone rocks, and served formerly as dens for these creatures, their bones and teeth are present in great abundance. In the celebrated cave at Kirkdale, in Yorkshire, Dr. Buckland estimated the detached teeth which he had himself either discovered or seen, as belonging to between 200 and 300 individuals, of all ages. The caverns in the Mendip Hills, more particularly at Bleadon and Sandford Hill, were probably the head-quarters of these powerful animals, which made our quiet chalk downs their hunting-ground.

In Case A 3 are remains of the fox (*Canis vulpes*), consisting of part of the lower jaw of the left side, with part of a canine and four molar teeth, also lower third of humerus. As far as we can judge from the teeth and the two small fragments of bone, the

fossil fox differed in no respect from the existing species. The same may be said of the wolf (*Canis lupus*) which is represented by the small piece of brick earth containing two lower molar teeth of the left half of the jaw; the bone has wholly perished, and even the hard enamel of the teeth is in a very friable condition.

The identification of the different species of oxen from isolated bones and detached molar teeth has always been considered most difficult, and in many cases impossible; indeed, Cuvier affirmed that the bones of the existing races of this numerous family resembled each other so closely that entire crania were necessary to satisfactorily determine the relation of the fossil species. The upper molar teeth from Fisherton are all unusually narrow, as will be readily seen by comparing them with the teeth from Burwell Fen and Erith.

Attention is directed to a very perfect series of upper molar teeth of both right and left sides, exhibited in Case B 1. The permanent premolars are fully developed in the jaw, and about to displace the deciduous ones; the crown of the last molar has just commenced to be worn down by the mastication of the food. These molar teeth are remarkable for possessing a small accessory column between the two lobes on the *external* surface, in addition to the one so constant in the upper molar teeth of the *bovidæ*, on the inner side. This column is most fully developed in the last molar, it is also very distinct in the second, but absent in the first true molar.

Several other molar teeth in this Case have this external accessory column more or less developed; from the size and general columnar appearance of the teeth, it is probable that they may have belonged to a small variety of bison. The remains of *bison* are more numerous at Fisherton than those of *bos*, and are much inferior in size to the bones of this animal from most other pleistocene deposits. It is not improbable that the scanty supply of grass afforded by our chalk hills is the true cause of the predominance of the small-sized breeds of the various herbivorous quadrupeds in this neighbourhood.

Many of the slender metatarsal bones have a raised ridge of bone on the inner side of the groove for the extensor tendon, and are similar to those in the Museum of the Royal College of Surgeons, obtained from the ossiferous fissures at Oreston. This ridge is also developed, although to a much less extent, in some of the metacarpal bones, so that a section of the bone a little above the middle is almost triangular. The great variation in size of many of the remains of bison has led Professor Owen to

assign the smaller bones to a distinct species under the name of *Bison minor.*

As no well-authenticated instance has yet occurred of the discovery of the small long-fronted ox (*Bos longifrons*) in pleistocene deposits, it is probable that the bones so named by Professor Owen* from Fisherton belonged to the above-mentioned species of bison. Mr. W. Boyd Dawkins, F.R.S., has since pointed out that the true *Bos longifrons*, although abundant in England prior to and during the Roman occupation of our island, has at present no title to rank as a true drift fossil.

Differing in a very marked manner from the slender, deer-like metacarpals of the aurochs are certain short, stout bones which probably belonged to a stunted variety of the great urus (*Bos primigenius*). The outline of the anterior surface of these bones, viewed in profile, is nearly straight, whilst the section a little above the middle is semicircular, instead of triangular, as in the metacarpals of bison. The fragment of horn core in Case B 1 must have belonged to a large animal; for although broken off some distance from the base, it still measures thirteen inches in circumference.

The great urus (*Bos primigenius*) was still living in the ancient forests of our island when Cæsar first invaded Britain; and the gigantic proportions of this animal was noticed by the Roman historian, who described it as but little inferior in size to the elephant. Its long horns were gracefully curved, first slightly backward and upward, then downward and forward, and lastly inward and upward, the tips spreading to a breadth of nearly five feet. On the top of Case C 1 is a very perfect, although small, skull of this ox, which was obtained from the peat of Burwell Fen, Cambridgeshire, about thirteen feet from the surface. The forehead is rather longer and narrower than in the typical examples of this species; it probably belonged to an adult female.

Amongst the more recent additions to the fauna of Fisherton is that of the musk sheep (*Ovibos moschatus*), for although this animal had previously been described as a Wiltshire fossil by Mr. W. Cunnington, F.G.S.,† no traces had been found in this neighbourhood. This curious creature is more closely allied to the sheep than ox, although from its large size it was at first

* 'Geo. Soc. Journal,' May, 1865

† 'Wilts Mag.,' vol. iv.

described under the latter title. It is now confined to the extreme northern latitudes of the American continent, where it lives associated with the reindeer, bears, and the various species of spermophiles and lemmings. It may be regarded as a rare visitant to our island during winters of great severity, and was probably never abundant here.

Bones, teeth, and shed antlers of the reindeer (*Cervus tarandus*) are very numerous in the brick earth of this neighbourhood; whilst, on the other hand, remains of the red deer (*Cervus elaphus*), are amongst our rarest fossils. That the latter creature existed and flourished is testified by the large size of its antlers—one specimen in Case B 3 measures 10¼ inches in circumference immediately above the burr.

Fossil antlers of the reindeer present two well-marked varieties; the smaller one has the beam of the horn smooth, and very much compressed laterally, corresponding with the species named *C. Guettardi*. Although the late Dr. Falconer regarded this as merely the young of *C. tarandus*, there are good grounds for believing he was in error in this respect.

Sir John Richardson* mentions that there are two well-marked and permanent varieties of caribou inhabiting the fur countries: one of them, confined to the woody and more southern districts, is the larger animal; it has small short horns, which are but little palmated; the other retires to the woods only in the winter, passing the summer on the coast of the Arctic Sea, or on the barren grounds. It is of small stature, but possesses branching horns; those of the old bucks are broadly palmated. The splendid antler in Case E 1 probably belonged to this variety.

It is a well-known fact that deer annually shed and reproduce their horns, and it is worthy of remark that the number of shed horns disinterred from the more recent geological deposits usually bear the same proportion as in the present day—four or five pair of shed antlers occurring to every single pair found attached to the skull. This is another argument in favour of the animals having lived and died in those places where we now find their fossilised remains.

Some good specimens of both upper and lower molar teeth of *C. tarandus* are exhibited; one series of upper molar teeth shows the deciduous or milk molars, about to be displaced by the permanent premolars; the last true molar has not risen to the level of the grinding surface of the other teeth.

* 'Fauna Boreali Americana,' vol. i.

At Fisherton, as in the various pleistocene deposits in other parts of England, remains of the horse and ox are more abundant than those of other animals, and of the former, as proved by the teeth and bones, there existed four varieties. One, which is chiefly distinguished by the elegant and more complex foldings of the enamel in the upper molar teeth, must have represented a horse of about thirteen or fourteen hands high. A second species is also mainly distinguished by the conformation of its teeth, having the second and third molars in both upper and lower jaws, relatively longer in an antero-posterior direction than in the existing race of horses. The third species was a large horse, whose bones and teeth are undistinguishable in an anatomical point of view from those of the present day; it not improbably represents the ancestors of the large black wild horse which formerly inhabited the extensive forests in the north of Gaul and the Netherlands. The fourth and most numerous variety was probably identical with the small pony which Cæsar found running wild in many parts of Britain, and whose descendants may still be traced in the small rough ponies of the New Forest, Dartmoor, and the Welsh Mountains. Some of the smaller teeth may possibly belong to a fossil ass of large size, but the remains as yet found are too fragmentary to admit of this being stated with certainty.

As an instance of primitive disease, the specimen in Case B 5 is very interesting; it consists of the anterior portion of the lower jaw of a young horse, the left side of which has been the seat of an osteosarcomatous growth which originated in the socket of the first molar tooth. The poor creature became weakened by this disease, and thus fell an easy victim to the first hungry enemy it met. Another striking example of disease is exhibited in Case B 1. It consists of the second cervical vertebra (axis) of a bison: necrosis of a small portion of the body of the vertebra has undoubtedly caused the death of this animal. This necrosis was probably occasioned by some violent shock in using its horns; and as these creatures often fight, tilting at each other with all the impetus and weight they can bring to bear, the disease might fairly be surmised to have been produced in this way;—perhaps the fatal termination of a glorious victory!

In Case A 2 and 3 are exhibited upper and lower molar teeth of the Tichorhine Rhinoceros (*Rhinoceros tichorhinus*) from Fisherton, Sherborne, Bath, and Erith.

The appearance of these teeth varies much according to the

age of the animal, the grinding surface being altered by the wearing down of the tooth in the process of mastication.

The Tichorhine rhinoceros, as well as the mammoth, was furnished with a thick coat of wool and hair, which enabled it to resist the extreme cold of an arctic winter. Like the present Indian species, it possessed two horns, which, from the peculiar structure of the nasal bones, Cuvier concluded were both larger and more formidable than in the existing animal.

Other species of rhinoceros have been discovered in pleistocene deposits in England; but at present no remains of either *Rhinoceros leptorhinus* or *Rhinoceros megarhinus* have been found in the neighbourhood of Salisbury.

Case A 3 contains some molar teeth and a small fragment of a tusk of the mammoth (*Elephas primigenius*).

The specimens are very insignificant fragments as compared with many found in the British Isles, especially the magnificent skull and tusks discovered at Ilford, Essex, in 1864, by Mr. A. Brady, and now exhibited in the geological department of the British Museum. One, however, well illustrates the progressive growth of the cement-forming capsule, which is hardened by the deposition of earthy salts, and thus converted into dentine: the partial decomposition which this fossil has sustained from the loss of nearly all its gelatine has caused the tusk to split up into a number of hollow cones. Many examples of tusks have been discovered so little altered by time as to be of considerable commercial value, finding a ready sale as a substitute for recent ivory. It is also turned to account by the Esquimaux, who use it for handles of tools and other purposes. The handle of the Esquimaux flint-flaking implement in Case E. 3 is made of mammoth ivory. The tusks of the mammoth were very much more curved than in any living elephant. The perfect specimens which have been found, arrange themselves in two groups: the larger tusks, which probably belonged to the male, measure 9½ feet in length, and about two feet in circumference; the smaller ones are only between five and six feet in length. A tusk found at Stroud, and now in the Museum of the Royal Agricultural College, Cirencester, measures upwards of 15 feet in length.

The small fragments of old or worn-out molar teeth are very interesting. The mammoth, like the Asiatic elephant, usually has but one molar tooth in use at a time. This is slowly worn down by the inevitable process of mastication, a new tooth forms behind and at the back of the old one, which thus becomes pushed forward, and finally out, by the growth of its

successor. The old tooth when thus worn down is pushed out and got rid of as useless. The occurrence, therefore, of these fragments at Fisherton is a strong argument in favour of the mammoth having lived in the immediate neighbourhood of the spot where we now find this curious evidence of its dentition.

In olden times two other species of elephant (*Elephas meridionalis* and *E. antiquus*) were inhabitants of our island: molar teeth of both these animals are shown in Case A 2. The dark-coloured molar of *E. antiquus* is from the blue clay of Cromer, Norfolk; the other specimens are from the drift-gravel near Bedford.

The lower molar and part of an upper molar tooth of *Elephas meridionalis* were obtained by the late Mr. H. Shorto of Salisbury, at Dewlish, Dorset, in 1814. The discovery is mentioned by Mr. Hall in the *Monthly Magazine* for May, 1814, as follows:—

"In the side of a chalk hill at Dewlish, Dorset, during the summer of 1813, an opening was made about 100 feet above its base to obtain sand, which had been discovered by a mousehole on that spot. At about 5 feet below the surface, which was turf, were found long pieces of wood, apparently of the willow kind, in a very crumbling state; two animals, to appearance, coiled up like a serpent, which fell to pieces on being handled; and other matters which the workmen called hands, somewhat petrified. Mr. Hall has one of the latter: it appears like the upper jaw of an animal, the bars of the mouth petrified; but no teeth visible; the whole a solid mass; Mr. Hall is uncertain whether it be animal or vegetable matter."

Mr. Hall observed in the pit whence the above matters were taken the following strata, which basset out on the surface:—

1. Chalk . . .	about 3 feet.		
2. White Clay. .	,, 2 ,,		
3. Sand	,, 3 ,,		
4. Chalk . . .	,, 2 ,,		
5. Gravel . . .	,, 3 ,,	containing large flints.	
6. White Clay. .	,, 2 ,,		
7. Chalk . . .	thickness not ascertained.		

Mr. Shorto visited the spot a month afterwards, and wrote to Mr. Hall as follows:—

Salisbury, *July* 21*st*, 1814.

"Dear Sir,—It gave me pleasure to see in the *Monthly Magazine* for May, a communication of yours respecting some organic remains found at Dewlish.

"I was at Dewlish last week, and procured some of the matters taken from

the pit on the side of the hill. They are the bones, grinders, and tusks of the elephant. The latter are what you conjectured to be wood of the willow kind. You were led to suppose this from their present decomposed, crumbling state, but I have no doubt of their being what I have stated them to be. I should like to have seen the animals you describe as being coiled up. I suppose they were Ammonites, and should like to obtain more of that substance which you say resembles the willow wood, as I have only a few small pieces.

"In the state I saw the pit, it appeared to me that these remains must have laid immediately under the oblique stratum of gravel, *upon* the clay, or intermixed with the bed of calcareous earth, for I saw no sand. I could not distinctly make out the strata which you enumerate. I could trace the gravel most distinctly, proceeding in a line upwards, and bassetting out on the top. The other strata, white clay, calcareous earth, and chalk, had been so confused by the operations of the workmen, that I could not discover their order. Indeed, all the bassetting surfaces, or terminations of these, the men had removed, and nothing remained but an excavation of about eight or ten feet square, twelve or fifteen feet below the surface, at the bottom of which I could only see earth and chalk rubbish. You, I hope, will pursue your researches further on the spot, as organic remains generally accompany that peculiar calcareous earth. I conjecture that *that* stratum of earth does not run very deep. Do you think there is a similar stratum on the opposite hill?

"Yours very truly,

"HENRY SHORTO."

Before the researches of Cuvier, the various elephantine remains found in the superficial quaternary deposits were looked upon as mere varieties of the existing Asiatic species and, absurd as it may now seem, persons were not wanting who boldly attributed the fossil remains of the mammoth, frequently disinterred in almost every county in England, to the *one* elephant imported by Cæsar. There are, however, well-marked anatomical differences. Those in the molar teeth are thus well described by Professor Owen: "The grinders are broader, and have narrower and more numerous and close-set transverse plates and ridges, than in other elephants. In the existing Indian species the molars are relatively narrower, the plates are less numerous, and their enamelled border is festooned. In the African elephant the plates are still fewer, are relatively larger, and so expanded at the middle as to present a lozenge-shape." The adult mammoth was at least a third larger than the largest of the existing elephants, and no animal of the drift fauna could have presented a more startling appearance, with its long, shaggy coat of reddish-brown hair and strange horn-like tusks.

The absence of remains of the pig in strata of this age is very remarkable, more especially in this neighbourhood, as in the

adjacent caves at Banwell their bones and teeth are by no means uncommonly met with. Again, in the Turbary period, so immediately subsequent to that of the Drift, both at Romsey and at Newbury, remains of the boar occur in the greatest profusion; and, descending still later to historic times, our Forest of Grovely was quite noted for the production of perfect giants in the shape of wild boars.

The hippopotamus, again, may perchance yet be discovered at Fisherton, although, from the general arctic character of the fauna of this deposit, it is hardly likely. The animals, however, that we may still expect to find remains of, are the little tail-less hare (*Lagomys*), the elk (*Alces malchis*), Irish elk (*Megaceros Hibernicus*), the wolverine or glutton (*Galo lucsus*), and cave bear (*Ursus spelæus*).

At one spot in the brick earth of Fisherton, teeth and bones of a spermophile, or pouched marmot, occur in great abundance; in some instances the entire skeleton has been discovered with the bones still articulated and undisturbed, showing that these little animals had perished, whilst coiled up in the usual attitude of hibernation. Possibly some exceptionally high spring flood had overwhelmed and destroyed them in their winter retreats ere the sun's friendly rays had had time to warn them of their danger. Remains of upwards of fifty individuals have already been discovered at Fisherton; very many have been found within a few feet of each other; hence it is highly probable that the fossil species was social in its habits, like the *S. Parryi* of the present day.

These specimens are probably similar to those obtained by Professor Kaup from the Eppelsheim sand, and described by him under the name of *Spermophilus superciliosus*. M. Pomel has also obtained the same species from Condes, Puy de Dome. And the late Dr. Falconer* has described a lower jaw of *Spermophilus* from the bone caves of the Mendip Hills, Somerset, under the provisional name of *S. erythrogenoides*, on account of the close resemblance of the fossil jaw to that of a recent Asiatic species (*S. erythrogenys*). This, however, may prove to be identical with Kaup's *S. superciliosus*.

This little spermophile, or pouched marmot, was about the size of a squirrel, and as no published account has been given of

* 'Palæontological Memoires,' vol. ii., p. 452. The engraving of the Fisherton fossil, plate xxxv., fig. 10, is reproduced from a rough drawing sent by me to Dr. Falconer. The form and direction of the condyle and ascending ramus are incorrect.—H. P. B.

it,* the subjoined anatomical details may be of service in identifying similar fossils in other localities. First, as regards the teeth; the incisors are strong, rounded anteriorly, and slightly flattened on the inner lateral surface; the molars are simple, the roots being long and distinct. The crown of the first upper molar consists of a single sharp transverse ridge; that of each of the remaining four is divided transversely by a deep valley bounded by two sharp ridges, which terminate externally in two pointed processes, and internally in a single rounded tubercle.

In the lower molars the tranverse valley is wider, and not so central; the anterior ridge is notched, and more elevated than the posterior one. Both upper and lower molar teeth gradually increase in size from before backwards, the first being the smallest and the last the largest of the series. In old individuals the thin coating of enamel is worn away at the more salient points. The nasal bones are rounded anteriorly; the frontal is flattened above, and slightly depressed between the well-marked superciliary ridges, which are elevated, and form posteriorly strong post-orbital processes. The parietal is a single bone; the suborbital foramen is round. Judging from the size of the orbit, the eyes must have been large. The clavicles are strong, and well developed; the humerus measures 1 inch $4\frac{1}{2}$ lines in length. From the size and shape of the last or unguial phalanx, the animal must have been armed with strong sharp claws.

Of the many spermophiles still living in the northern parts of British America, *S. Parryi*, *S. Douglassii*, *S. Richardsoni*, and *S. Franklandi* are those which approach nearest to the fossil; they all, however, present marked points of difference, and in no case are the superciliary ridges so raised or strongly marked. The teeth of *S. Richardsoni* bear a closer resemblance to those of the fossil than any other North American species, and have transverse ridges in the upper molars well marked; but the general appearance of the skull is much more slender—the frontal bone only slightly convex between the orbits, and the zygomatic processes narrower, and curved more backwards.

There are, however, certain Asiatic species which are even more nearly allied to our Fisherton spermophile than those from America. The superciliary ridges are well developed in *S. erythrogenys*, *S. mugosaricus*, and *S. concolor*.

S. concolor is rather smaller than the fossil; the outline of the

* I published a short account of this Spermophile in 1864. See 'Descriptive Catalogue of the Salisbury and South Wilts Museum,' pp. 103—104.—H. P. B.

skull is more curved, and the superciliary ridges much flatter. The teeth are very similar, but the transverse ridges in the upper molars are not so prominent.

S. mugosaricus.—The superciliary ridges are as well developed and elevated as in the fossil; the frontal is also concave between the orbits, and the post-orbital processes strong and curved backwards: the palate is rather narrower. The upper molar teeth are slightly narrower, and the transverse ridges not so prominent. The first upper molar is notched.

S. erythrogenys.—This is the species which upon the whole most closely resembles the fossil, and may eventually prove to be a mere variety of it. The superciliary ridges are rather less elevated; the zygomatic arch at its junction with the malar bone is narrower, and the parietal bones more convex laterally. Both upper and lower teeth are very like, but are rather smaller in *S. erythrogenys* than in the fossil. This is a Siberian species, and is found inhabiting the Altaï mountains. In general appearance and colour it is very like a small rabbit with a long tail; the Souslik (*S. concolor*), on the other hand, in point of colour resembles a hare.

The brick earth of Fisherton has also produced remains of two species of lemming; the larger one is identical with an animal still living in Siberia, and described by Pallas under the name of ringed lemming (*Lemmus torquatus*), on account of a pale brown mark or ring round its neck. There is a good recent skull in the British Museum, with which the present fossil has been compared, and found to agree. This species has been recently discovered by Mr. J. W. Flower, F.G.S., in the bone cave called Wokey Hole, Somersetshire. The other remains in size correspond with the Norway lemming (*Lemmus Norvegicus*), but differ from it in the form and arrangement of the molar teeth.

The bones of the fossil belonged to an animal rather larger than our common field vole (*Arvicola agrestis*), for the remains of which it might at first sight have been easily mistaken. A constant and well marked difference, however, exists in the second upper molar tooth, which in the fossil is composed of only four triangular cement spaces instead of the five always present in the field vole. The ribs or lateral angles are rather more acute, and in the third lower molar are more prominent on the outer side than in *A. agrestis*.

The following is the dentition of the fossil:—

The upper incisor teeth are broad and flat on the inner side.

Upper Molar Teeth,—The first is composed of five triangular cement spaces, and has three ribs or angles on each side. The second has six cement spaces, with two internal and three external angles. The third has six cement spaces; the two last are confluent and not triangular, but like the figure 6 reversed. There are four angles on each side.

Lower Molar Teeth.—The first is composed of nine cemental spaces, the three first of which are confluent; it has six internal and five external angles. The second has five cement spaces and three angles on each side. The third has only three cement spaces and three angles on either side.

Both upper and lower molar teeth are entirely without roots.

The palate is relatively narrower and more deeply grooved; the lower articular surface of the humerus is also broader, the internal condyle more prominent, and the deltoïd crest extends lower down in the fossil than in the vole.

The hare (*Lepus timidus*) is represented by the upper half of a left femur. This bone, and those of the preceding rodents, are in the same semi-fossilized condition as those of the larger extinct mammalia; it was, moreover, dug up about 12 feet from the surface. Professor Owen* has demonstrated that a hare, probably identical with the existing Irish species, was contemporary with the mammoth, rhinoceros, &c.

Two fragments of egg-shell are shown in Case A 3. The smaller egg-shell corresponds in size to a similar fragment of an egg of a wild duck (*Anas boschas*); the larger one to that of a wild goose (*Anser palustris*).

These two specimens are extremely interesting, being the only examples hitherto met with in this country of fossil egg-shells occurring in deposits of this age. They are both stained of a pale fawn colour, and in many parts are covered with superficial encrustations. The coracoid bone and part of the femur of a wild goose (*Anser palustris*) were found within a few feet of the larger specimen, but no bones accompanied the other. Both were obtained from undisturbed brick earth at a very considerable depth from the surface. Although the wild goose is said formerly to have bred in the fens of Cambridgeshire, Norfolk, and Lincolnshire, yet the nesting of this bird is at the present day restricted to more northern climes, whither they migrate towards the end of April.

The discoveries in the brick earth of Fisherton teach us a

* 'British Fossil Mammalia and Birds,' p. 211.

useful lesson as to the worthlessness of mere negative evidence in all geological researches. This clay had not formerly been carefully examined, and the bones obtained from it were consequently few in number, and indicated a most limited fauna. Even now many of the animals are only known from isolated fragments of their bones; whilst others, as before mentioned, will doubtless be brought to light by more extended researches. Amongst these may confidently be anticipated the discovery of some osseous relic of MAN, the ingenious fabricator of the palæolithic implements, and the contemporary of creatures which are now extinct. In obedience to the universal law of creation, their forms have passed away, and will never be reproduced.

H. P. BLACKMORE, M.D.

Drift Series.

THE following is a list of the contents of the Cases in the order of their sequence; for more detailed account of the objects, see the preceding notice.

SHELLS.

A 1.

This Case contains specimens of land, fresh-water, and marine shells, from the base of the loëss at Menchecourt, in the valley of the Somme, France.

LAND SHELLS FROM THE PLEISTOCENE FLUVIO-MARINE SAND (SABLE AIGRE) OF MENCHECOURT, NEAR ABBEVILLE, CONSISTING OF

1. Limax agrestis
2. Helix arbustorum
3. Vitrina pellucida
4. Pupa muscorum juv.?
5. Helix
6. ,, pulchella
7. ,, pygmæa
8. Cyclostoma elegans

FRESH-WATER SHELLS FROM THE SABLE AIGRE OF MENCHECOURT.

9. Lymnæa limosa
10. ,, palustris
11. Velletia lacustris
12. Planorbis carinatus
13. ,, spirobis
14. ,, vortex
15. Bithynia tentaculata
16. Bithynia ventricosa
17. Valvata piscinalis
18. ,, cristata
19. Cyclas rivicola (?)
20. ,, cornea
21. Pisidium pulchellum

MARINE SHELLS FROM THE SABLE AIGRE OF MENCHECOURT.

22. Buccinum undatum
23. Litorina rudis
24. Litorina
25. Tellina solidula
26. Hydrobia marginata

The following land and fresh-water shells are exhibited from the loëss of Fisherton Anger, near Salisbury.

FRESH-WATER SHELLS.	LAND SHELLS.
Ancylus fluviatilis	Succinea putris
Lymnæa palustris	,, elegans
,, limosa	,, oblonga *
Planorbis spirobis	Helix arbustorum
,, carinatus	,, nemoralis
Bithynia tentaculata	,, pygmæa
Valvata piscinalis	,, pulchella
Pisidium fontinale	,, hispida
,, pulchellum var. (Jenyns)	,, ,, var. concinna
,, pusillum	,, rotundata
,, obtusale	,, fulva
	Pupa muscorum
	Zua subcylindrica

Mammalian Remains.

A 2.

Contains a series of lower molar teeth of cave lion (*Felis spelæa*), from the brick-earth of Menchecourt, in the valley of the Somme, France.

Portions of the lower tusks of hippopotamus (*Hippopotamus major*), from the drift of Sussex and Bedford.

Upper and lower molar teeth of *Rhinoceros tichorhinus*, from Sherborne (Dorset), Bath, Erith (Kent), and Bedford.

One lower and part of upper molar of *Elephas meridionalis*, from Dewlish, Dorset.

Lower molar teeth of *Elephas antiquus*, from the forest bed at Cromer, Bedford.

Also upper and lower molar teeth and portions of tusks of Mammoth (*Elephas primigenius*), from Bedford; Ashford, near Fordingbridge; Wishford, near Salisbury; Cambridge; and the "Elephant bed" of the late Dr. Mantell, on the coast, near Brighton.

A 3.

All the fossils in this Case are from Fisherton Anger, near Salisbury, and consist of—

Two lower molar teeth of wolf (*Canis lupus*).

Portion of humerus and lower jaw containing teeth of fox (*Canis vulpes*).

* This is the only shell not found at present in this neighbourhood.

A perfect series of upper molar teeth of reindeer (*Cervus tarandus*), belonging to an old animal.

Both upper and lower molar teeth of *Rhinoceros tichorhinus*, showing different stages of wear.

Molar teeth of mammoth (*Elephas primigenius*), including three examples of the old worn-down or used-out molars, also a fine lower molar from the lower level gravel of South Burcombe, near Fisherton. The fragment of tusk illustrates its formation of hollow cones, one fitting within the other. This arrangement is produced by the hardening of the cement-forming capsule.

Skulls and bones of the Fisherton spermophile; some examples show the curled-up position assumed by the creature in its long winter sleep.

Portions of clay contained remains of several individuals of lemming (*Lemmus, sp.* ?).

Tablet containing imperfect upper and lower jaws, teeth and bones of ringed lemming (*Lemmus torquatus*).

Fragment of left femur of hare (*Lepus timidus*).

B 1.

All the remains in this Case are from Fisherton. Metacarpal and metatarsal bones of bison (*B. priscus*), also of a small variety (*Bison minor* ?).

1st and 2nd vertebræ of bison. The second or axis shows necrosis of the body.

Series of upper molar teeth of young animal, remarkable for possessing a well-developed accessory column on the outer side of the true molars.

Portions of a large horn core and skull of urus (*Bos primigenius*); also small stout metacarpal bones, probably belonging to a small variety of the same animal.

B 2.

Contains metacarpal and metatarsal bones of urus (*Bos primigenius*) from Erith, Kent; Banwell (bone cave), Somerset; and Fisherton; also various other bones of bos and bison, from Fisherton.

B 3.

All the remains in this Case are from Fisherton.

They consist of portion of lower jaw of cave lion (*Felis spelæa*) with the last molar *in situ*.

Nearly half lower jaw of cave hyæna (*Hyæna spelæa*), containing one incisor, the canine, and three molar teeth.

Base of shed antler of red deer (*Cervus elaphus*), of large size, and other smaller fragments of antlers.

Horn core of bison (*Bison minor* ?)

Left nasal bone and portion of tibia and astragalus of musk sheep (*Ovibos moschatus*).

Fragments of bones and antlers showing marks of gnawing, probably by young hyænas or wolves.

Detached teeth and bones of urus and bison.

B 4 AND E 1.

Contain shed antlers of two varieties of reindeer (*Cervus tarandus*), as well as bones and teeth—all from Fisherton.

B 5.

Teeth and bones of horse (*Equus fossilis* and *E. caballus*), all from Fisherton. These remains indicate horses of different sizes.

B 6.

Contains fragments of bones of mammoth (*Elephas primigenius*), rhinoceros (*R. tichorhinus*), and horse (*Equus fossilis*), all from Fisherton.

C 1.

Contains metacarpal and metatarsal bones of urus (*Bos primigenius*) and bison (*Bison priscus*), from Fisherton.

C 2.

Contains humerus of horse (*Equus fossilis*), from the drift gravel at Amiens, in the valley of the Somme, France.

Distal extremity of tibia of red deer (*Cervus elaphus*), from Menchecourt, France.

Teeth and bones of urus (*Bos primigenius*), from Erith, Kent; and Bedford.

C 3.

Contains teeth, bones, and portions of antler of reindeer (*Cervus tarandus*), from Fisherton. These remains belonged chiefly to young animals.

Rolled or waterworn bones are exhibited; this condition is exceptional at Fisherton.

Cave Series.

MAMMALIAN REMAINS.

B 7.

Lower jaws and teeth of cave bear (*Ursus spelæus*) from the bone caves of the Pyrenees (L'herm and Bouichéta, Ariège).

B 8.

Contains teeth of hyæna (*Hyæna spelæa*), wolf (*Canis lupus*), portion of lower jaw of fox (*Canis vulpes*), rhinoceros (*Rhinoceros tichorhinus*), horse (*Equus fossilis*), urus (*Bos primigenius*), from Aurignac (Haute Garonne,) France.

Portion of lower jaw of ox, from Massat (Ariège), France.

Fragment of lower jaw of reindeer (*Cervus tarandus*), from La Vâche (Ariège).

Teeth of ox and bones of reindeer (*C. tarandus*), from Laugerie (Dordogne), France.

Bones of ox and reindeer (*C. tarandus*), from La Madelaine (Dordogne), France.

Bones of reindeer (*C. tarandus*) and horse (*Equus fossilis*), from Les Eyzies (Dordogne), France.

B 9.

Contains remains of reindeer (*C. tarandus*), consisting of portions of antlers, upper and lower molar teeth, and fragments of various bones.

Teeth and bones of large species of ox.

Portion of lower jaw containing teeth, detached upper molars and bones of horse (*Equus caballus*) from the bone cave of Les Eyzies (Dordogne), France.

Also bones of spotted hyena (*Hyæna crocuta*), fox (*Canis*

vulpes), ox (large animal), fallow deer (*Cervus dama* var. *barbarus*), red deer (*Cervus elaphus*), goat (*Capra hircus?*), ibex (*Capra ægoceros*), pig (*Sus scrofa*), and black rat (*Mus rattus*). Skulls and bones of rabbit (*Lepus cuniculus*). Many bones of different species of birds. Portions of human skulls and bones found associated with the above remains in the Genista Caves, Gibraltar; presented by Colonel Henry Hope Crealock, and Captain Brome.

Cases 4 and 5.

Contain bones and teeth of ox (*Bos taurus*).

Sheep (*Ovis sp.* ?), variety with slightly curved and laterally compressed horns, in some respects resembling the small Dartmoor and Welsh sheep.

Goat (*Capra hircus*), and pig (*Sus scrofa*) from the caves of Bédeilhac, Niaux, and Alliat (Ariège), Pyrenees.

All these remains belong to the neolithic period.

Cases A 4, 5, 6, and C 6.

Contain animal remains from the Turbaries of Cambridgeshire, Bedfordshire, Berkshire, and Wiltshire, comprising a nearly entire skeleton of red deer (*Cervus elaphus*), antlers of roe deer (*Cervus capreolus*) urus (*Bos primigenius*), long-fronted ox (*Bos longifrons*), sheep (*Ovis sp.* ?), wild boar (*Sus scrofa*), and horse (*Equus caballus*).

H 1.

On the top of this Case is exhibited the skull of urus (*Bos primigenius*) from Burwell Fen.

H 2.

On the top of this Case are mounted several very fine antlers of red deer (*Cervus elaphus*) from Oxford; and Swaffham Priory, Cambridgeshire.

H. P. BLACKMORE, M.D.

Stone Age Collection.

SIR JOHN LUBBOCK has suggested the terms *Palæolithic* and *Neolithic* for the two main divisions of the Stone Age.*

Palæolithic Period.

Implements of the Palæolithic period are formed by the process of chipping only; no single instance of finishing them by artificial rubbing has been observed. They are also usually found associated with remains of the mammoth, the woolly-rhinoceros, the musk-ox, the reindeer, and other animals, many of which are of extinct species, whilst the entire fauna presents more of an arctic character than that of the present day.

Flint implements have been repeatedly found *in situ* in undisturbed beds of sand, loam, and gravel, deposited chiefly in valleys of certain rivers in England and France, and which deposits belong to the post-pliocene or Quaternary period of geologists. It follows, therefore, that the age of the implements cannot be less, whilst it may be greater, than that of the beds themselves.

The alteration which has taken place in the climate since these beds were deposited, no less than the extinction of many of the larger mammalia of the Quaternary period, shows a great lapse of time; but the antiquity of the valley-gravels is proved more completely from their not having been deposited by any sudden cataclysm, and from a consideration of the time requisite for the excavation of the valleys to their present depth by rivers now flowing through them. Due allowance must, however, be made for the torrential character of the rivers of the

* Palæolithic, "Old Stone," παλαιος, old, λιθος, a stone; Neolithic, "New Stone," νεος, new, λιθος, a stone.

Quaternary period, as these doubtless at times possessed immense excavating power, by means of the sudden thawing of ice and snow, which had accumulated under the conditions of a more arctic winter.

Our knowledge of the Palæolithic period has been greatly extended by the discoveries made in certain bone-caves in England, France, and other countries, in which the remains of a fauna, closely resembling that obtained from the valley-gravels, have been discovered. Many of the bone implements from these caves exhibit artificial rubbing, yet in no instance have the flint implements been similarly finished.

The following conclusions with regard to the drift implements, and the beds in which they occur, were published in 1864, and subsequent discoveries have not induced any modification of them.*

1st, That certain chipped and flaked flints, found in the valley-gravels of England and France, were so chipped and flaked by man's hand, and are readily distinguished from the other flints in the same beds which have been fractured by natural causes.

2nd, That these human-worked flints are found in undisturbed beds, exhibiting that rough stratification common to drift deposits, and, therefore, that the *beds* afford evidence that the implements are contemporary with them.

3rd, That these implements *in themselves* afford evidence of having been deposited contemporaneously with the other materials of the drift beds in which they occur. When found in gravel they are water-worn, like the other flints, or they are like them polished from the action of the sandy water, which flowed alike over rough flint and chipped implement lying side by side; but in all cases the implements bear the same external appearance and *patina* as do the naturally-fractured flints associated with them. Now as this patina extends over the *whole* surface of the implements, they must have been chipped into their present form before they were exposed to this process of natural polishing, in common with the other materials in the deposit. From this it follows that the implements themselves afford evidence that they are coeval with the beds in which they are now found.

4th, That the beds in which these implements are found con-

* Descriptive Catalogue of the Salisbury and South Wilts Museum, pp. 4, 5.

tain the remains of mammalia, the majority of which are of extinct species. That these mammalian remains have not been washed out of any older geological formation, but that the animals to which they belonged lived and died during the deposition of the drift beds. True, where the deposit is a coarse gravel, the bones, like the implements and the gravel, are water-worn; all, as constituent parts of the same bed, have been subject to the same rolling action; but in the tranquil reaches of the stream, where it assumed a lacustrine character, and the deposit, as at Fisherton Anger, near Salisbury, is brick earth, the sediment of turbid and nearly stagnant water, the mammalian remains have not been rolled at all; the carcase may have floated down the stream, or the animal may have died on the spot, but the bones, divested of the integuments, have not travelled at all, and in looking at them we see the remains of the actual fauna of the drift period.

To sum up what has been advanced. The human-worked flints are coeval with the valley-gravels. The unrolled condition of the mammalian bones establishes the fact that the animals also were coeval with the valley-gravels; it follows, therefore, that man, the fabricator of the implements, was coeval with the Mammoth and the other extinct animals whose remains occur in these beds.

Neolithic Period.

During the Neolithic period some of the flint and stone implements, such as *hatchets* and *axes*, after having been chipped into shape, were finished by artificial rubbing or polishing; whilst many others, such as *arrow-heads* and *scrapers*, were still formed by the processes of flaking and chipping only.

The implements of the Palæolithic differ greatly in form from those of the Neolithic period, yet no absolutely sharp line of demarcation, as to type, severs the drift implements from those of the caves, or the implements of the caves from those of the surface. In palæontology the rare types of one geological period become the prevalent forms of another, in this respect presenting an analogy to the objects of the Stone age. If we assume that the drift-folk "thought out" the form of their weapons and the mode of their manufacture, in a manner entirely differing from what has been done by any

other race of men, we are driven to the conclusion that there must have been also something wholly different in the drift-people themselves, or in the conditions under which they existed; for all later evidence tends to prove that the workings of human minds and human hands in the Stone age have produced very similar results in every quarter of the globe.

No implements of characteristic Neolithic types have been found under circumstances enabling us to assign them to the Palæolithic period; but the reverse cannot be asserted, although cases are rare; neither have remains of the extinct mammalia (Mammoth, &c.) been found with objects of the Neolithic period.

In his introduction to the translation of Professor Nilsson's work on the Stone Age of Scandinavia, Sir John Lubbock has given the following summary of some leading characteristics of the Neolithic period :—

"The implements in question were in use before the introduction or discovery of metal. It is a great mistake to suppose that implements of stone were abandoned directly metal was discovered. For certain purposes, as for arrow-heads, stone would be quite as suitable as the more precious substance. Flint-flakes, moreover, were so useful, and so easily obtained, that they were occasionally employed even down to a very late period. Even for axes and chisels, the incontestable superiority of metal was for a while counterbalanced by its greater costliness. Captain Cook, indeed, tells us that in Tahiti the implements of stone and bone were in a very few years replaced by those of metal; a stone hatchet was then, he says, 'as rare a thing as an iron one was eight years ago, and a chisel of bone or stone is not to be seen.' The rapidity with which the change from stone to metal is effected depends on the supply of the latter. In the above case, Cook had with him abundance of metal, in exchange for which the islanders supplied his vessels with great quantities of fresh meat, vegetables, and other more questionable articles of merchandise. The introduction of metal into Europe was certainly far more gradual; stone and metal were long used side by side, and archæologists are often too hasty in referring stone implements to the Stone age. It would be easy to quote numerous instances in which implements have been, without any sufficient reason, referred to the Stone age, merely because they were formed of stone. The two Stone ages are characterised, not merely by the use of stone, but by the use of stone to the exclusion of metal. I cannot, therefore, too strongly impress on

archæologists *that many stone implements belong to the Metallic period.* Why, then, it will be asked, may they not all have done so? and this question I will now endeavour to answer.

"The Danish shell-mounds are the refuse heaps of the ancient inhabitants, round whose dwellings the bones and shells of the animals on which they fed gradually accumulated. Like a modern dustheap, these shell-mounds contain all kinds of household objects—some purposely thrown away as useless, but some also accidentally lost. These mounds have been examined with great care by the Danish archæologists, and especially by Professor Steenstrup. Many thousand implements of stone and bone have been obtained from them; and as, on the one hand, from the absence of extinct animals, and of implements belonging to the Palæolithic age, we conclude that these shell-mounds do not belong to that period, so, on the other hand, from the absence of all trace of metal, we are justified in referring them to a period when metal was unknown.

"The same arguments apply to some of the Swiss lake-dwellings, the discovery of which we owe to Dr. Keller, and which have been so admirably studied by Desor, Morlot, Troyon, and other Swiss archæologists. . . . In some of them (the lake-dwellings) objects of metal are very abundant; in others, which have been not less carefully or thoughtfully explored, stone implements are met with to the exclusion of metallic ones. It may occur, perhaps, to some, that the absence of metal in some of the lake-villages, and its presence in others, is to be accounted for by its scarcity—that, in fact, metal will be found when the localities shall have been sufficiently searched. But the settlements in which metal occurs are deficient in stone implements. Take the same number of objects from Wangen and Nidau, and in the one case 90 per cent. will be of metal, while in the other the whole number are of stone or bone. This cannot be accidental—the numbers are too great to admit of such a hypothesis; nor can the fact be accounted for by contemporaneous differences of civilization, because the localities are too close together; neither is it an affair of wealth, because we find such articles as fishhooks, &c., made of metal.

"We may also, I think, safely refer some of the tumuli or burial mounds to this period. When we find a large tumulus, the erection of which must have been extremely laborious, it is evident that it must have been erected in honour of some distinguished individual; and when his flint-daggers, axes, &c.—which from the labour and difficulty of making them, must have been

of great value—were deposited in the tomb, it is reasonable to conclude that if he had possessed any arms of metal, they also would have been buried with him. This we know was done in subsequent periods. In burials of the Stone age the corpse was either deposited in a sitting position, or burnt; but rarely, if ever, extended at full length.

"It is an error to suppose that the rudest flint implements are necessarily the oldest. The Palæolithic implements show admirable workmanship. Moreover, every flint implement is rude at first. A bronze celt is cast perfect; but a flint implement is rudely blocked out in the first instance, and then, if any concealed flaw comes to light, or if any ill-directed blow causes an inconvenient fracture, the unfinished implement is perhaps thrown away. Moreover, the simplest flint flake forms a capital knife, and accordingly we find that some simple stone implements were in use long after metal had replaced the beautifully-worked axes, knives, and daggers, which must always have been very difficult to make. The period immediately before the introduction of metal may reasonably be supposed to be that of the best stone implements, but the use of the simpler ones lingered long. Moreover, there are some reasons to believe that pierced stone axes are characteristic of the early metallic period.

"Hand-made pottery is abundant in the shell-mounds and the lake-villages, as well as in the tumuli which appear to belong to the Stone age. No conclusive evidence that the potter's wheel was yet in use has been discovered.

"The dog is the only domestic animal found in the shell-mounds; but remains of the ox, sheep, goat, and pig appear in the lake-villages. There is some doubt about the horse; and the barn-door fowl, as well as the cat, was unknown.

"The presence of corn-crushers, as well as of carbonised wheat, barley, and flax, in the Swiss lake-dwellings proves that agriculture was already pursued with success in Central Europe. Oats, rye, and hemp were unknown.

"Tissues of woven flax have been found in some of the Swiss lake-villages.

"At least two forms of skull, one long and one round, are found in the tumuli which appear to belong to this period. Until now, however, we have not a single human skull from the Danish shell-mounds, nor from any Swiss lake-dwelling, which can be referred with certainty to this period." *

* 'The Primitive Inhabitants of Scandinavia.' By Sven Nilsson. Edited by Sir John Lubbock, Bart., F.R.S., &c. (Editor's Introduction, pp. 25—29.)

PALÆOLITHIC PERIOD.

Drift Series.

Attention was called to the human-worked flints obtained from the drift of the Somme Valley, by the late M. Boucher de Perthes, rather more than twenty years since.*

In April, 1857, Mr. Prestwich, F.R.S., and Mr. John Evans, F.S.A., inspected the Abbeville beds, under the guidance of M. Boucher de Perthes; and, at Amiens, Mr. Prestwich and Mr. Evans saw one of the pear-shaped flint implements *in situ*. In the same year Mr. J. W. Flower, F.G.S., found a pear-shaped flint implement *in situ* at Amiens; shortly afterwards Mr. James Wyatt, F.G.S., and Mr. T. Rupert Jones, F.G.S., were equally fortunate.†

Singularly enough, a flint implement appears to have been found in the drift of Salisbury in 1846, although the circumstance has only recently been brought to light. (See pp. 46 and 47.) Signor Ceselli also found flint flakes in the drift at Ponte-Mammolo, near Rome, associated with remains of elephant, rhinoceros, &c.,‡ so long ago as 1846; almost simultaneously, in fact, with the discoveries in the Somme Valley and at Salisbury.

It is worthy of notice that a disbelief in the human workmanship of these rude drift implements should have arisen *only* when it was found that an extreme antiquity was claimed for them, on account of their geological position. Mr. Franks, V.P.S.A., has directed attention to a drift implement in the British Museum, which is thus described in the Sloane Catalogue :—"No. 246. A British weapon, found with elephant's tooth, opposite to black Mary's, near Grayes-inn-lane—Conyers. It is a large black flint, shaped into the figure of a spear's point, K."§ A rude engraving of this specimen illustrates a letter on the Antiquities of London, by Mr. Bagford, dated 1715, printed in Hearne's edition of Leland's 'Collectanea,' vol. i., p. lxiii. Clearly no doubt as to the human workmanship of this specimen was entertained either when it was discovered or during the many years it has formed part of the national collection.

Mr. Frere, F.R.S., communicated a paper to the Society of

* 'Antiquités Celtiques et Antédiluviennes,' Paris, 1847. Several papers upon the subject were read by M. Boucher de Perthes to the Société d'Emulation d'Abbeville in 1840, 1841, 1842, 1843, 1844, 1845, and 1846.

† Evans, 'Archæologia,' vol. xxxix., p. 59.

‡ Correspondance de Rome, May 4, June 8, 1867.

§ Evans, 'Archæologia,' xxxviii., p. 301.

Antiquaries (London), which was read June 22, 1797.* It gives a circumstantial account of the discovery of flint implements in the drift at Hoxne, in Suffolk. Mr. Frere describes the implements as having been found in great numbers, at a depth of about twelve feet, in a stratified brick earth. The human workmanship of these specimens does not appear to have been questioned at the time. Some of the implements found by Mr. Frere were presented to the Society of Antiquaries, and are still in their Museum; they agree in every respect with the usual drift types. On visiting the pits at Hoxne in 1859, Mr. Evans and Mr. Prestwich obtained an implement from a stone heap in the pit, and another specimen was thrown out from a trench made under their own supervision.†

Mr. Evans has made a general classification of the implements found in the drift as follows:—

1. Flint flakes—apparently intended for arrow-heads and knives.
2. Pointed weapons—some probably lance or spear heads.
3. Oval or almond-shaped implements—presenting a cutting edge all round.‡

Since this was written, some new types of drift implements have been found, and no doubt Mr. Evans, in his forthcoming book, will modify the above classification. Until a fresh nomenclature has been decided upon, it may be well to state what these new forms of drift implements are, and in what respects they differ from the pointed (pear-shaped) weapons and the oval or almond-shaped implements of Mr. Evans.

One characteristic of the pointed or pear-shaped implements is their *not* having a cutting or sharp edge all round; the broad end of the implement is left as a rounded butt, apparently to adapt the object for use in the hand. A characteristic of the ovoid and oval implements is, that they have no such butt; they present a sharp edge all round.

Implements of a *heart-shaped* form have been found in the drift, which in outline do not differ much from the pear-shaped implements, except that they are relatively broader and shorter, but they differ wholly from them when seen in section, as they *have* a cutting edge all round.

Another class of implements has also been obtained from the drift; they are *shoe-shaped*, and have a flat under side, the general

* 'Archæologia,' vol. xiii., p. 204.

† Evans, 'Archæologia,' vol. xxxviii., p. 300.

‡ Evans, 'Archæologia,' vol. xxxviii., p. 289, and vol. xxxix., p. 75.

form of the implement resembling that of a shoe, sloping up to the instep.

A third class of implements consists of *scrapers*, flint flakes of a more or less semi-lunar form, the straight side of which is broad, for use in the hand, whilst the curved edge is more or less blunted by a series of blows, apparently administered in order to substitute a scraping for a cutting edge. (See page 43.)

The specimens exhibited from the drift in the Blackmore Museum are classed as follows :—

1. Flint flakes—some of which show subsequent chipping at the edges.
2. Scrapers—flint flakes of a more or less semi-lunar form, left broad at the straight side, and with the curved edge blunted by a series of purposely administered blows, in order to give a scraping rather than a cutting edge to the implement. Other scrapers, approaching the neolithic forms, have also been found in the drift. (See page 50.)
3. Pointed or pear-shaped implements—having, in typical specimens, a rounded butt, a sharp edge at the sides, and a pointed end.
4. Shoe-shaped implements—in typical specimens perfectly flat on the under side, and on the upper side rising towards the centre in the form of a shoe, the thick end (heel) almost unworked, the sides and the rounded point (toe) brought to a sharp edge. These implements may have been used as adzes, the flat side resting upon a corresponding flat portion of the wooden handle, as with some stone tools in recent use among savages.
5. Discoïdal implements—very coarsely worked; in typical specimens nearly circular, very thick in the centre, and brought to an edge all round; they differ in form and in workmanship from the oval implements. They may have been used as missiles.
6. Oval implements—having a sharp edge all round, and in section thickening towards the middle.
7. Heart-shaped implements—in typical examples having a sharp edge all round, but in some cases presenting in section a thickening towards the broad end rather than towards the middle. If any of the drift implements were employed as spear-heads, it is probable that these heart-shaped implements were so used.

It has been suggested by Mr. Flower that some of the drift implements were used as hoes, or hand-spades, or dibbles, per-

haps for digging roots.* The late M. Boucher de Perthes has also thrown out the idea that they might have been employed for splitting wood, or in grubbing for esculent roots.

Mr. Prestwich thinks that some of the drift implements may have been used as chisels for breaking holes in ice. It is known that the people inhabiting high northern latitudes, when deer and other game become scarce on the land, betake themselves to fishing in the rivers; and for this purpose, and also to obtain water for drinking, they cut round holes in the ice, a foot or more in diameter, through which they spear fish or catch them with a hook and line. In the present day the tool used for cutting this hole is generally of metal, but when these are not to be had, chisels of hornstone are employed. In some districts the aboriginal ice-chisel was made from a single prong of the antler of the elk, which was firmly tied to a handle of wood four or five feet long.† The Dacotahs make a hole in the ice about six inches across, and then cover themselves with a robe, which enables them to see to the bottom of the water. They carve a piece of wood into the shape of a fish, and tie a string to it, by which they give it a jerking movement in the water; this lure attracts the fish, which are then speared.‡

Cases A 7, 8, B 10, and D 10.

The flint implements in these Cases are from the valley-gravels (drift) of France, chiefly from St. Acheul and Abbeville, in the valley of the Somme, and from Vaudricourt (Pas-de-Calais).

A 7.

Nos. 8 and 9 are simple flakes, showing the bulb of percussion upon the under surface. The remainder of the specimens are implements of the *pear-shaped* class, having a bulbous termination at one end, and a point at the other. No. 1 may be instanced as a rude example of this type, and No. 6 as a well-finished specimen of it. No. 12 may have been used as a boring-tool.

A 8.

The specimens in this case are of the *oval* class, having a sharp edge all round; this type, however, passes into the *pear-*

* 'Quart. Journal of the Geological Society,' February, 1867, p. 47.

† Schoolcraft, vol. i., pp. 88, 89.

‡ Schoolcraft, vol. iv., p. 61.

shaped type by intermediate forms, so that no sharp line separates the two. No. 6 is a typical oval. Nos. 12, 13, and 14 are of the *shoe-shaped* type. No. 13 is a typical example. Nos. 15 and 23 are of the *heart-shaped* type. No. 4, when made, must have been black over its entire surface; some slight idea of the time which has elapsed since it was chipped into form can be derived from observing the thickness of the white crust, the formation of which is due entirely to age.

D 10

Contains the other specimens exhibited from the drift of France. Nos. 10, 11, 12, 13, and 14 are from Poitou; they are of drift type, although found upon the surface soil.

B 10.

In this Case, Nos. 10 and 11 are *scrapers*—implements with a broad back and a blunt edge, closely resembling tools in recent use by the Esquimaux for removing fat, &c., in preparing skins for clothing and the like. Modern examples of these tools may be seen in Case D 5, Nos. 14, 15, 16, and 17.

A 9 to A 18, B 10, D 8, and D 9.

Flint Implements from the Drift of England.

A 9.

Implements from the river-gravels of the valley of the Lark, at Warren Hill, Mildenhall,* and Bury St. Edmunds. No. 13 is a well-finished implement. Nos. 7, 8, and 17 are of the discoïdal class, resembling many belonging to the neolithic (later stone) period. No. 18 is one of these for comparison. Attention is directed to Case A 51, in which implements of a similar form are exhibited (Nos. 1 to 8), which were found in a tumulus in Ohio, U.S.A.†

It is probable that some of these discoïdal implements were used as missiles. Mr. Evans has remarked that the workmen regarded the ordinary forms of drift implements as sling-stones.‡

The discovery of flint implements in the drift at Bury St. Edmunds was made by Mr. H. Prigg, jun., of that place, who obtained the first in October, 1862. Mr. Prigg, also, has by his

* Warren Hill is the part of Mildenhall parish which adjoins Icklingham.

† Evans, 'Archæologia,' vol. xxxviii., p. 279.

‡ Evans, 'Archæologia,' vol. xxxviii., p. 292.

investigations led to the discovery of flint implements in the drift at Thetford, and elsewhere.*

A 10, A 12, and D 8.

Implements from the Drift of the Valley of the Lark, at Icklingham, Suffolk.

A 10

Contains implements of rude workmanship, some being little more than flakes. Mr. John Evans, F.S.A., drew attention to the existence of flint implements in the drift gravel at Icklingham in 1859.†

A 11.

In this Case some good specimens are shown. No. 5 may be noticed. No. 6 is one of the choicest specimens yet obtained from the drift of England; it belongs to the *heart-shaped* class; the patina which covers the entire surface is remarkable. No. 11 is a good example of the *shoe-shaped* class.

A 12.

The implements in this Case are of the *oval* class, of which No. 5 is a good typical example.

A 13, A 14, and D 8.

Implements from the Drift of the Valley of the Little Ouse, at and near Thetford, Norfolk.

These as a *group* are of a more *pear-shaped* form than those from Icklingham, which as a *group* approach the *oval* type.

A 13.

Nos. 1 to 4 are from Broomhill, near Brandon; Nos. 5 and 6 from Santon Downham, near Brandon; the rest are rudely-formed implements from Thetford. No. 6 has been presented to the collection by Mr. James Wyatt, F.G.S.

A 14.

All the specimens in this Case are from Thetford. Nos. 1, 2, 3, 7, and 9 are good examples of *pear-shaped* implements.

* 'Quart. Journ. Suffolk Institute of Archæology and Nat. Hist.,' part i., p. 4.
† 'Archæologia,' vol. xxxviii., p. 302.

No. 20, from White Hill, Thetford, is a remarkable specimen. Mr. Flower has discovered several new localities in the drift of the valley of the Little Ouse, from which he has obtained flint implements.

A 15.

Nos. 1, 2, 3, and 4 are implements from the valley of the Ouse, at Biddenham, near Bedford; they are all good typical examples from this deposit. No. 3 is particularly fine in its workmanship; it is also well patinated.

These specimens have been most kindly presented to the collection by Mr. James Wyatt, F.G.S., of Bedford. The patient researches of Mr. Wyatt in the valley-gravels near Bedford resulted in his obtaining from them two flint implements on the 8th April, 1861; since which time he has added about thirty-five other specimens to his collection from this locality.†

Nos. 5 to 17 are implements from the drift which caps the cliffs on the coast at Hill Head, near Fareham, Hants; No. 11 was obtained from a mass which had fallen from the cliff; all the rest were found upon the beach, as will be seen from their water-worn condition. In No. 7 the rounded butt of the flint has been left unworked; probably this implement was used in the hand, like the modern hand-adze from New Guinea, in Case E 2, No. 7. No. 13 is a very fine specimen of the *oval* class.

The discovery of flint implements at Hill Head was made by Mr. James Brown, of Salisbury, on the 31st of May, 1863.‡ All the specimens exhibited from this locality were found by Mr. Brown and his friends.

A somewhat similar discovery to the above was made by Mr. Leech in the shingle at the base of the cliff between Herne Bay and the Reculvers, in the autumn of 1860. One of the specimens found by Mr. Leech was made from a flint pebble derived from the tertiary beds, the rounded butt of which was unworked—evidently so left on purpose, as it presented a smooth surface fitting it for use in the hand.§

Mr. Flower has observed that the flint of which the drift

* Flower, 'Quart. Journal of the Geological Society,' February, 1867.

† Wyatt, 'Proceedings of the Bedfordshire Architectural and Archæological Society,' 1862. Wyatt, 'Quart. Journal Geological Society,' August, 1864.

‡ Evans, 'Quart. Journal of the Geological Society,' February 24, 1864, pp. 188, 189.

§ Evans, 'Archæologia,' vol. xxxix., p. 64.

implements are made is not such as was obtained direct from the chalk, but flint nodules, or pebbles, such as were found on the surface of the land, or in the channels or banks of rivers.* During the Neolithic period, also, flakes and tools were not unfrequently made from flint pebbles collected on the sea-shore. With the imperfect tools at the command of the drift-folk, it would have been exceedingly laborious to excavate for flint. A broad margin of flints existed on each side of the drift-river, except at flood time, just as now a wide border of stones lies on either side of any alpine stream; and from these flints the drift-people doubtless selected forms as nearly as possible resembling the implements intended to be made: that this selection took place is evident from the patches of original external crust which are found over many parts of the implements. The large assortment of flint nodules, such as would be strewed on what were in flood times shoals or banks in the torrent, probably afforded the requisite variety of shapes for the pre-historic tool-maker, without other labour than that of selection.

A 16, 17, 18, B 10, and D 9.

Implements from the Drift of the Neighbourhood of Salisbury.

A 16

Contains specimens from the drift-gravel at Elm Grove, Milford Hill, Salisbury. No. 19 is a *scraper* (see page 43). Nos. 14 and 15 are *borers*. No. 2 is a poor example of the *shoe-shaped* class.

A 17.

These implements are also from Elm Grove. Nos. 7 and 9 are remarkable specimens; they are flat on the under side, as also is No. 6. No. 9 is of chert, derived from the upper green-sand, a very tough material, seldom used for implements.† No. 14 is a fine example of the oval class.

* Flower, 'Quart. Journal Geo. Soc.,' Feb. 1867, p. 50.

† Mr. P. Norman Evans found a drift implement of chert at Bournemouth, in March, 1868. Since the above was written, Mr. John Evans has informed me that he has obtained an implement of *greenstone* from the drift of the Little Ouse near Brandon. "It is," he says, "precisely similar to those of flint, and of the ovato-lanceolate form, rather thin, and slightly unsymmetrical, so as to have something of the shape of a roach or bream."—E. T. S.

The first implement from the gravel at Milford Hill was found by Dr. Blackmore on April 27, 1864.*

A flint implement, however, was obtained from the drift of Salisbury about twenty years since; it is labelled 'Salisbury, 1846;' but no exact record of the circumstances under which it was discovered has been preserved. It was given to the late Dr. Woodward, of the British Museum, who put it aside, as it had little reference to his own special studies.† This specimen is now in the collection of Mr. Prestwich, F.G.S.; it was lent by him to Mr. Cunnington, F.G.S., who exhibited it at the Salisbury meeting of the Wiltshire Archæological and Natural History Society, September, 1865. It does not, either in type or condition, resemble the implements since found in the neighbourhood of Salisbury.

A 18.

Nos. 1 to 14, and No. 25, are from the gravel capping the hill which divides the Avon and the Wiley valleys, above Bemerton, between Salisbury and Wilton. No. 3 is a remarkably small implement. No. 25 is a *scraper* of the type more abundant during the Neolithic than the Palæolithic period. In Case B 10, No. 27 is another example of this type from Britford, near Salisbury.

The discovery of flint implements in the gravel at Bemerton was made by Dr. Blackmore, September 14, 1863.‡

Nos. 15 and 16 are from the brick-earth (*loess*) at Fisherton Anger, near Salisbury; No. 16 is a good example of the *heart-shaped* type; it was found beneath remains of the mammoth, July 8, 1864. No. 17 is from the drift at South Newton, about five miles above Salisbury, in the Wiley valley; it is the only specimen hitherto obtained from this locality, and was found by Mr. James Sidford, in May, 1868, by whom it has been presented to the collection. No. 18 is from the drift at Lake, about six miles above Salisbury, in the Avon valley. The discovery of implements at Lake was made by Mr. Tiffin, jun., of Salisbury, Oct. 13th, 1865. Nos. 19, 20, 21, and 22 are from the drift-gravel at Ashford (the new railway station), near Fordingbridge, Hants. Implements were first obtained from this locality by

* Dr. Blackmore on the 'Discovery of Flint Implements at Milford Hill:' 'Archæological Journal.'

† Prestwich, 'The Quaternary Beds near Salisbury,' read at the opening of the Blackmore Museum.

‡ Evans, 'Quart. Journal, Geological Soc., 1864,' pp. 190-194.

Mr. Toomer, of Salisbury, April 10th, 1866; these and some other specimens subsequently found by him have been presented to the collection.

Nos. 23 and 24 are from the drift capping the cliff at Bournemouth. The first implement from Bournemouth was found by Mr. Alfred H. Stevens, of Salisbury, in May, 1866.*

D 8.

In this Case the less perfect specimens from Bury St. Edmunds, Icklingham, and Thetford, are exhibited.

D 9.

In this Case, the less perfect specimens from Milford Hill, Bemerton, Hill Head, and Bournemouth are exhibited.

D 10.

In this Case, in addition to the implements from the drift of France already alluded to, there is a series of implements made of quartzite from the laterite deposits of the Madras Presidency, East Indies—Nos. 1 to 8. They are of the same types as the implements from the drift of England and France, and were found by Mr. R. Bruce Foote, F.G.S., of the Geological Survey of India, who has presented them to the collection.

These quartzite implements occur scattered irregularly upon the surface of rising grounds, and even upon open plains, in some cases as much as 2000 feet above the present level of the sea. They have, however, been more frequently obtained from the beds of the little lateral valleys of the streams, and appear in such cases to have been washed out of the beds of gravel and shingle exposed on the banks of these valleys. They have been found *in situ*, at depths ranging from four to seven feet, in a bed of pale yellow and greyish coarse clay, more or less mixed with sand, fine gravel, and shingle, which sometimes attains a thickness of twenty feet.†

* Lyell's 'Principles of Geology,' 10th Edition, 1868, vol. 2, p. 562. A few other specimens have been found at Bournemouth; they are in the possession of Mr. John Evans and Mr. Albert Way.

† W. King and R. B. Foote; Dr. T. Oldham, 'Proceedings of the Asiatic Society of Bengal,' 1864, p. 67; Dr. Oldham, R. B. Foote, CÆ. Oldham; W. King, 'Proceedings of the Asiatic Society of Bengal,' 1865, p. 206; R. B. Foote, 'Madras Journal of Literature and Science,' October, 1866, pp. 1-46; W. King, 'Proceedings of the Asiatic Society of Bengal,' September, 1867; R. B. Foote, 'Quart. Journal Geol. Society,' 1868, p. 484.

In a paper read by Mr. Bruce Foote at Norwich, in August, 1868, he pointed out that all the types of flint implements present in the drift of England and France occur in the laterite deposits of Madras. He stated that the discoïdal specimens from the East Indies were more finely worked than any he had seen from the drift of Western Europe.* Oval and ovoid forms of implements occur abundantly in the laterite beds; many of these, however, have a square chisel-like cutting edge at one end: this type is rare in drift deposits. No. 9 is the cast of an implement from the drift of Spain; it is an example of the type named, and closely resembles the specimen (No. 1) immediately beneath it, from the gorge of the Naggery River. The discovery of the original of No. 9 in the quaternary beds of San-Isidro, near Madrid, was announced to the Geological Society of France by MM. de Verneuil and L. Lartet, on the 22nd June, 1863. Subsequently, Signor Casiano de Prado, Inspector-General of Mines, who had taken the two French geologists to San-Isidro, found seven other flint implements of drift types at the same locality.† It is worthy of remark that all these implements are made from flints derived from the tertiary strata. ("Ces silex taillés sont des silex tertiaires remaniés; la craie d'Espagne ne contient pas de rognons siliceux.")‡

Signor Casiano de Prado has also found an implement of quartzite in the same deposit. These implements from San-Isidro were found in a bed beneath one containing remains of elephant and rhinoceros.

B 10.

In this Case examples of *scrapers* are shown. Nos. 1 to 11. Nos. 12 to 16 are specimens of the so-called "fossil beads." The presence of these objects in the drift has been considered as a further proof of man's existence at the remote period when these beds were deposited. The "fossil beads" are, however, common fossils in the chalk (*orbitolina globularis*), in which they are found in the perforated condition, or solid, or with a more or less shallow hole in their substance. The perforation of these non-drifted specimens in the chalk is

* This paper will be published in the 'Proceedings of the International Congress of Pre-historic Archæology,' 1868.

† Six of these are figured in the first part of his 'Descripcion física y geológica de la Provincia de Madrid.'

‡ 'Matériaux pour l'Histoire de l'Homme,' par Gabriel de Mortillet, vol. i., pp. 136, 137.

often as smooth and straight as if artificial. The interior surface, however, is not worn, but consists of the natural structure of the organism, and may be due to the *orbitolina* having grown around a smooth stem of seaweed. As *perforated* specimens of this fossil occur in the chalk, so do *im*-perforate *orbitolinæ* occur in the valley-gravels, and it is obvious that the fossil beads of the drift must be regarded simply as evidence of the denudation of chalk, although there is no reason that the drift-folk should not have selected these perforated objects for decorative purposes.

No. 27 is a scraper of the form least frequently found in the drift. Nos. 17 to 26, and 28 to 34, are chiefly waste flakes, struck off during the manufacture of implements. Nos. 28 and 33 show much subsequent work.

D 3.

In this Case forgeries of implements of drift type are exhibited,—Nos. 1 to 32. Nos. 1 to 3, 6 to 8, 10, 14, 21 to 24, 28, and 30 are the productions of French artists. Nos. 6 to 8 are from Abbeville: an attempt has been made to give false patina to these specimens. Nos. 2 and 11 were bought in Paris. The rest of the French forgeries were chiefly obtained at St. Acheul. The productions of "Flint Jack" are Nos. 9, 17, 18, 25 to 27, 29, 31, and 32. These he made in Salisbury *to order*. Nos. 15 and 16 are drift flints which have been *improved* by the finders. The remaining forgeries are the work of amateurs connected with the Museum. (See Nos. 5 and 13.)

Nos. 33 to 56 are exhibited as natural forms of flint; these in no case show human workmanship, but from their form are calculated to mislead inexperienced collectors.

Hafting.

Much speculation has arisen with respect to the way in which the drift implements were hafted. In Case E 2 implements of stone and shell, in use by modern savages, are exhibited in their original handles for the purpose of illustration. No. 7 is a hand-adze from New Guinea. Many of the drift implements, having a bulbous termination, were doubtless used—like this tool—in the hand. Some of the oval drift implements may have been mounted at a right angle to the handle, like No. 12, although No. 12 is drilled, which is not the case with any implement from the drift.

PALÆOLITHIC PERIOD.

Cave Series.

B 11 to B 16, C 10 to C 12.

The specimens in these Cases have been obtained chiefly from the caves of France. No artificial rubbing occurs upon any of the flint implements. Remains of a fauna, nearly identical with that of the drift, abound in these caves, intermingled with vestiges of human industry, but no trace of any domesticated animal has been observed.

The "Guide to the Christy Museum," recently written by Mr. Franks, V.P.S.A., Keeper of "British Antiquities and Ethnography" at the British Museum, and the splendid work, "Reliquiæ Aquitanicæ," now in course of publication by the Executors of the late Mr. Henry Christy, should be consulted by those desiring further and more ample information respecting the caves of the Dordogne.

The objects exhibited have been found in caves, and under rock-shelters, on the banks of the Vézère, Dordogne, by the late Mr. Henry Christy, and his friend M. E. L. Lartet, of Paris; the whole of the expenses attending these investigations were borne by Mr. Christy.

The different stations have been classed according to their supposed relative antiquity.

B 11.

1. *Le Moustier.*—This is a cave at an elevation of 90 feet above the river Vézère, Dordogne, France. Remains of the mammoth and the hyena have been found in it. The flint implements are of very drift-like types. The large *scrapers*, such as Nos. 6 to 10, closely resemble those exhibited from the drift (Case B 10, Nos. 1 to 11), and also the examples in recent use by the Esquimaux (Case D 5, Nos. 14 to 17). Stone skin-scrapers of a similar form are in present use by the Merrimack Indians.* Nos. 13 to 18 are flint spear-heads; No. 19*a* is similar to the *discoïdal* type of implement found in the drift (see Case 8, Nos, 7, 8, and 17); No. 25 is the cast of a hammer-stone showing bruising from use. For comparison, see Case A 19, Nos. 4 and 7; A 20, Nos. 1, 2, 3; A 21, Nos. 13 and 20; all of which belong to the later

* Schoolcraft's 'Archives of Aboriginal Knowledge,' vol. iv., p. 175.

Stone period (neolithic). Not a single worked bone or sculptured animal figure has been found at Le Moustier.

B 12 TO B 15, C 10 TO C 12.

2. *Gorge d'Enfer.*—A rock-shelter in the Gorge d'Enfer (a small valley off the Vézère) has produced worked bone implements, among which may be noticed arrow-heads of a peculiar type, and flint implements, principally long flakes and scrapers, which last are shown on tablets 3 and 4. See also cast of bone implement C 10, tablet 1.

To the same period belong the objects from the cave of Aurignac (Haute Garonne), Case B 11, tablets 1 and 2; and from the cave of Rebinac (Basses-Pyrénées), Case B 11, tablet 3.

3. *Les Eyzies, La Madelaine, &c.*—The cave of Les Eyzies is situated at 114 feet above the level of the Vézère. After having served as a habitation for the early occupants, who left on the floor their rubbish, such as bones, broken implements, &c., an infiltration of water, containing calcareous matter, took place, which formed a cake, or breccia, on the surface of the floor of the cave, and secured the objects beneath from being disturbed. Specimens of this breccia, containing broken animal bones and human-worked flints, are shown upon the top of Case H 5, Nos. 1 and 2, and in Case C 10, Nos. 3, 7, and 8. No. 7 contains a *scraper* of flint still embedded in the matrix.

The objects discovered in Les Eyzies are flint-flakes, Case B 13, tablets 17 to 21, and 26 to 32; flint-scrapers, Case B 13, tablets 9 to 16, and 23 and 24; nuclei, or cores, from which flakes have been struck off, Case B 13, tablet 25; hammer stones and mortars; the bones of horse, reindeer, ox, &c., some of them worked, Case B 13, tablets 2 and 6; a few engravings on bone and stone, see cast, Case B 13, tablets 4 and 5; bone needles, barbed spear or harpoon heads, &c., Case B 13, tablets 1 and 3; and portions of hæmatite which have probably served for paint, Case B 13, tablet 8.

From the rock-shelter at La Madelaine the following objects have been obtained in greater abundance than at Les Eyzies:—worked bones, Case B 15, tablets 21 and 22, C 12, tablet 11; harpoon heads, Case B 15, tablets 1 to 8, C 12, tablets 1 and 2, some of which are casts; sculptured bones, Case B 15, tablets 9 to 16 and 23 and 24, Case C 12, tablets 3 to 9, some of which are casts; Case C 12, tablet 10, is the cast of a portion of a mammoth's tusk, upon which is engraved the outline of that animal;

a stone mortar is exhibited in Case C 10, No. 9. The animal remains at La Madelaine present no difference as to species from those found at Les Eyzies. The objects found in the cave at Massat (Ariége), Case B 11, tablets 4 and 5, are classed with those from Les Eyzies and La Madelaine.

4. *Laugerie Haute.*—This station on the right bank of the Vézère is a rock-shelter, and has produced various remains, including a number of delicately chipped flint lance-heads, some of them closely resembling in type the flint spear-heads of Denmark and England, Case B 12, tablet 7; drills of flint, Case B 12, tablet 8. Arrow-heads and harpoon heads of bone are rare at this station, although at Laugerie Basse, near by, they are abundant, Case B 12, tablets 11 and 12; Case C 11, tablet 3. Casts of sculptured bone from Laugerie Basse are exhibited, Case B 12, tablets 9 and 10, C 10, tablets 5 and 6, C 11, tablets 1, 2, 4, and 5; and bone needles with drilled eyes, Case B 12 tablet 13.

B 14.

Tablets 1 to 17 display flint flakes and scrapers from the cave of Chaffaud (Vienne), France.

B 16

Contains a series of worked bone objects, flint flakes, &c., from the cave of La Vâche* (Ariége). Upon tablet 12 are some bone needles, with drilled eyes, from this cave.

SCRAPERS.

The large number of flint scrapers found in the caves of the Dordogne will have struck the observer. The broad flint scrapers from Le Moustier resemble those found in the drift; whilst the Greenland Esquimaux still employ a tool of very similar form. At the other stations in the Dordogne, however, the flint scrapers are of a different type—see Case B 13, tablets 9 to 16; these resemble scrapers of another shape which are still in use by the Esquimaux. In Case B 12, tablet 24, is the cast of such a modern scraper now in the Christy Collection, London; the original is of lydite, mounted in a handle of fossil ivory. In Case E 2, No. 2, is a modern Esquimaux scraper of flint in its original handle of wood, grooved to receive the two first fingers and the thumb of the right hand; the other two fingers were doubled underneath the handle of the implement, which was pushed forward by the palm of the hand, and had a planing action.

* Caverne d'Alliat.

The absence of objects which would have served in the processes of spinning and weaving, coupled with the presence of such an enormous number of tools used in preparing skins, leads to the supposition that the dwellers in these caves clad themselves, as do the modern Esquimaux, with the dressed hides of animals.

Fauna of the Caves of the Dordogne.

The reindeer appears to be less dominant, numerically, at Le Moustier than at any other cave or rock-shelter in the valley of the Vézère. Remains of the Mammoth have been found at Le Moustier, the two Laugeries, La Madelaine, and Les Eyzies; and worked ivory at Les Eyzies, the cave of Cro Magnon, near by, and at La Madelaine.

It is singular that, except at La Madelaine, none of the bones appear to have been gnawed by beasts of prey. The cave-people, therefore, either occupied these caves permanently, at all seasons of the year, or else they possessed some method of closing them when deserted, so as to exclude the carnivorous animals which would otherwise have been attracted by the vast accumulation of bones, &c., left in them.

There is almost a complete absence of the backbones of ox and horse at the stations. It is probable that these animals, after having been slaughtered by the aboriginal huntsmen, were cut up on the spot, and that only the extremities, with their fleshy parts, and the marrow-bones, were carried away. At Aurignac, also, the vertebræ of rhinoceros, aurochs, and horse are absent. The backbones of the smaller animals, such as the reindeer, are abundant in the caves of the Dordogne, and the carcases of such were probably carried there entire. All the heads of animals appear to have been taken, probably for the sake of the brain, as they are all broken, the fragments only remaining. Several tribes of savages use brain in preparing skins.* The Esquimaux, however, whose habits appear to closely resemble those of the cave-dwellers of the Dordogne, dress skins in a very different and far more disgusting manner.

Although the wild tribes of the Veddahs of Ceylon live under very different conditions as to climate from those of the old cave-people of the Dordogne, yet some of the habits of the Veddahs serve to illustrate our ideas of the mode of life of the pre-historic cave-folk. These Veddahs live in small septs or

* Catlin, 'North American Indians,' vol. i., pp. 45, 46. Schoolcraft, vol. iv., pp. 60, 61.

families occupying generally caves in the rocks, although some have little bark huts. Until 1855, they depended *solely* upon hunting for their support.*

International Exhibition at Paris, 1867.

At the recent Exhibition in Paris, a magnificent series illustrative of the objects found in the caves of France was displayed in the first room devoted to the "Histoire du Travail." Those who did not see this collection will do well to read an admirable work upon the subject written by M. Gabriel de Mortillet.† Such a fine series is scarcely likely to be brought together again for many years, and a very brief notice of some of the more interesting objects in it may not be out of place in this Guide.

M. de Vibraye exhibited three specimens of worked hyaline quartz from Laugerie-Haute, Dordogne, as well as flint-drills, lance-heads, scrapers, and whetstones from the same locality. From Laugerie-Basse, M. de Vibraye exhibited seven specimens of worked hyaline quartz, a necklace of dentalium shells, and teeth of animals, pierced for suspension.

M. Peccadeau de l'Isle contributed a stone grooved by use in sharpening and polishing tools; an outline of some carnivorous animal with a long tail, traced upon a piece of antler of reindeer, drilled for suspension; whistles made from bones of reindeer; two teeth of red deer, drilled for suspension,—all from caves of Dordogne and caves in Tarn et Garonne.

M. V. Brun exhibited flint saws toothed on one and on both sides, and fifty-seven teeth of animals, drilled for suspension, from the rock-shelter of Bruniquel (Tarn et Garonne).

Among the objects shown were pebbles hollowed in their centre similar to No. 9, Case 10. In the American department of the Exhibition was a modern stone implement, in use by the Osage tribe, which resembled these ancient objects; like them, it consists of a granite pebble hollowed in the centre, and was probably employed for grinding paint, for the adornment of the person.

An inspection of the series exhibited in the Blackmore Museum from the caves of the Dordogne will convince the visitor that man existed in France contemporaneously with some extinct animals, such as the mammoth, and with other animals, such as the reindeer, which have migrated to regions possessing for them a more congenial climate. The proof exists

* Bailey, 'Wild Tribes of the Veddahs of Ceylon,' 'Trans. Ethnological Society, London,' vol. ii., p. 281.

† 'Promenades Préhistoriques à l'Exposition Universelle,' Paris, 1867.

in the numerous faithful delineations of these creatures which have been found in the caves,—not, indeed, merely representing the forms of the animals, but actually carved upon remains of the animals themselves.

M. Peccadeau de l'Isle sent to the Paris Exhibition figures of reindeer carved in fossil (mammoth) ivory from the rock-shelter of Bruniquel (Tarn et Garonne).

M. de Vibraye exhibited a head of an elephant sculptured upon a fragment of antler of reindeer with remains of a drilled hole for suspension; also a carving, said to be that of a bird with a long neck, and the body of a woman, carved in mammoth ivory (the head and feet were missing),—all from Laugerie-Basse.

Representations of the following animals were included in the collection at the Paris Exhibition :—

Mammoth.—One from La Madelaine, Dordogne, exhibited by MM. Lartet and Christy; another from Bruniquel (Tarn et Garonne), by M. Peccadeau de l'Isle; and the head of another from Laugerie-Basse, Dordogne, by M. de Vibraye.

Reindeer.—From Laugerie-Basse and La Madelaine, by MM. Lartet and Christy; from Bruniquel, by M. Peccadeau de l'Isle; and from Laugerie-Basse, by M. de Vibraye.

Cave Lion.—From Bruniquel, by M. Brun.

Cave Bear.—From Massat, Ariége, by M. Garrigou.

Stag.—From La Madelaine, by MM. Lartet and Christy.

Aurochs.—From Laugerie-Basse, by M. de Vibraye; and from Les Eyzies, by MM. Lartet and Christy.

Horse.—From La Madelaine and Laugerie-Basse, by MM. Lartet and Christy.

Goat.—From La Madelaine and Laugerie-Basse, by MM. Lartet and Christy; and from Massat, by M. Garrigou.

Birds.—From Laugerie-Basse, by M. de Vibraye; and from La Madelaine, by MM. Lartet and Christy.

Fish.—From La Madelaine, by MM. Lartet and Christy; from Laugerie-Basse, by M. de Vibraye; and from La Vâche, Ariége, by M. Garrigou.

Reptiles.—From La Madelaine, by MM. Lartet and Christy.

Nor were representations of *Man* wanting. In addition to the figure of a woman, already named as having been exhibited by M. de Vibraye from Laugerie-Basse, an outline of a human figure from La Madelaine was exhibited by MM. Lartet and Christy; see cast of this specimen tablet, 13 (*b*), Case B 15. Representations of flowers were shown from La Madelaine by MM. Lartet and Christy, and from Laugerie-Basse by M. de Vibraye.

NEOLITHIC PERIOD.*

Ancient Pit-Dwellings near Salisbury.

A 19, B 17, D 11, D 12, and H 6.

In these Cases are shown the objects chiefly obtained in 1866 from some interesting pit-dwellings explored by Mr. Adlam, at Highfield, near Salisbury; several specimens, however, were found in making the excavations for the Fisherton Waterworks in 1868. Some of these pits appear to have been filled in, re-excavated, and filled in a second time. The material employed for filling in the pits was usually a dark surface-soil, containing a large number of calcined flints (see page 59), as well as now and then a small quantity of charcoal. In filling in the pits, as appears more perfectly from an examination of them in section, occasionally the drift-gravel, or even the underlying chalk, was used, for bands of these materials occur at intervals. The pits are single, or in groups communicating with each other. They are of a beehive form, ranging in diameter at the base from 5 feet 6 inches to 7 feet, although in some exceptional cases they measure as much as 14 feet. The entrance to each pit, or to each group of pits, appears to have been by a shaft of about 3 feet in diameter.

The pits are carried to a depth of from 7 to 10 feet in the soil, which is a drift-gravel resting on chalk. The makers have studied the properties of the chalk, for they have enlarged their dome-like dwellings, when possible, beneath the looser gravel.

Some ancient pit-dwellings at Gallibury and Rowborough, Isle of Wight, have been examined and described by the Rev. E. Kell, M.A., F.S.A. These pits are larger than those at Highfield, being from 15 feet to upwards of 40 feet in diameter;—no question, however, that the foundering in of the sides has led to some slight excess in the calculation of the original diameter. Still, allowing for this, the Highfield pits were without doubt smaller.†

Pit-dwellings exist in various parts of England, in France, and elsewhere. Souterrains occur in the departments of Tarn, Tarn-et-Garonne, Haute-Garonne,‡ and Haute-Loire.§ Several underground refuges exist in La Vendée, the date of which has

* See pages 35—38.

† 'Journal British Archæological Association,' vol. xi., pp. 305—313.

‡ 'Matériaux pour l'Histoire de l'Homme,' vol. ii., p. 547.

§ 'Matériaux,' *l.c.*, vol. ii., p. 218.

been assigned to the end of the twelfth or even so late as the commencement of the thirteenth century.* Stone hatchets have, however, been found in the souterrains of Saint-Pierre-de-Livron, of Dardé, of Croquelardit, of Marsal, of Lapéruguie, and of Léojac.†

The animal remains found in the Highfield pits belong to *Bos longifrons*, red-deer, roe-deer, a small variety of goat, sheep, dog, fox, pig, horse, rabbit, water-rat, field-vole, field-mouse, house-mouse, weasel, hedgehog, shrew, several birds, toad, frog, and fish (perhaps salmon). Nearly all the bones show marks of cutting, particularly at the parts where the sinews were attached. Some bones were burnt at detached spots, as if they had been held to the fire for the purpose of toasting the meat upon them.

The circular form of habitation exhibited in these pit-dwellings appears to be that almost universally adopted by savages. Dr. Livingstone mentions that he found it impossible even to teach the natives of South Africa to build a square hut. When left to themselves for a few minutes, they invariably reverted to the circle. All the earliest habitations of pre-historic times are either circular or oval.‡

The lodges of the Mandans were circular, sunk about two feet in the ground; the walls were formed of poles, covered with earth to the depth of two or three feet, which received an outer coating of clay, rendering it impervious to water. The roof sloped at an angle of about 45 degrees, and in the centre of the roof was a hole, serving for chimney and skylight, four feet across. The Highfield pits are much smaller than the Mandan lodges, some of which were fifty feet in diameter. The huts of the Digger Indians are mere pits sunk in the ground, with a framework of sticks over them, covered with old skins and a layer of earth.§

The Navajoe Indians live in circular huts, or at times in caves, and under rock-shelters. Their cooking is carried on outside the hut.‖ The negro never cooks in his hut; his fireplace is

* 'Matériaux,' *l.c.*, vol. ii., p. 73.

† 'Matériaux,' *l.c.*, vol. ii., p. 439.

‡ 'Primitive Warfare,' by Colonel A. Lane Fox, F.S.A., a paper read before the members of the United Service Institution, June 5, 1868.

§ Catlin, 'North American Indians,' vol. i., pp. 81, 82.

‖ The Navajoe wigwams are constructed of the tabular debris of rock, with dry earth laid on a circular frame of poles. The fire for cooking is external. Their wigwam is in the form of a cone, rarely more than 5 feet high. The Navajoes are nomadic; have no permanent residences, and frequently shelter themselves in caves or fissures of the rocks.—Schoolcraft, part iii., p. 70.

in the open air outside.* The Highfield pit-dwellers appear in like manner to have cooked their food outside the pits.

There are some trenches at Highfield which probably served as a protection to the settlement. These trenches, in places, are too shallow alone to have served as a barrier to foes. The Mandans surrounded their village with a palisade having a trench only three or four feet deep *inside* it; the object of this trench was to screen the bodies of the defenders whilst they discharged their weapons through the palisade. Perhaps the trenches at Highfield served a similar purpose.

From the large number of calcined flint nodules, of a convenient size for grasping in the hand, which occur in the material used for filling in the pits, it is probable that the Highfield pit-dwellers practised "stone-boiling;" that they cooked their food by heating stones and casting them into the water, possibly because their pottery was not sufficiently well made to stand the direct heat of the fire. Heated stones have been used in various parts of the world for baking meat in holes in the ground;† but none of the Highfield pits appear to have been exposed to the action of heat, and there is no reason for supposing that any of them have served as ovens of this kind. At Villeneuve-le-Roi (Seine et Oise), France, some pit-

* *Times*, April 12, 1866.

† The following account may serve as a general description of this mode of cooking. The New Zealand oven is a hole about a foot deep, in which a great quantity of dry wood is placed and covered over with a number of stones. The wood is set on fire, and burns until the stones become red-hot. When the stones are sufficiently heated, the larger pieces of unconsumed wood are removed, some green bushes which have been dipped in water are laid round the edges, and the stones are covered with green leaves; the meat to be cooked is placed upon the leaves, other green leaves are laid over the meat, and a mat is spread over the top of the hole. Lastly, about three pints of water are poured on the mat, which, running through to the stones, causes a great steam to rise; the whole is then instantly covered over with earth.—'The New Zealanders,' Library of Entertaining Knowledge, p. 96. The idol human heads of the Jívaros Indians of Ecuador are prepared thus. "After a war, the victors cut off the heads of their victims, the skull and its contents are removed, a stone heated by fire is introduced into the skin of the head, desiccation goes on, and it is reduced to a miniature size, without loss of the features."—W. Bollaert, 'Trans. Ethnological Society of London,' vol. ii., pp. 112—114. A head such as described was sent to the Paris Exhibition from Ecuador. One of the Indian methods for cooking fish in Vancouver Island is to cover the fire with stones; on these stones water is sprinkled, and fish are placed upon them, mats saturated with fresh water being thrown over all. In this way as many as fifty salmon are cooked at once.—G. M. Sproat, 'Trans. Ethnological Society,' London, vol. v., p. 249.

dwellings closely resembling those at Highfield in size and form have been described in the "Revue Archéologique" (1860). These were filled in with black mould, affording a strong contrast in colour, as was the case at Highfield, to the surrounding undisturbed soil. At Villeneuve there were also some curious oven-like chambers, having a chimney communicating with the surface; the inside of these ovens had been lined with wattled work, some of the sticks of which were charred, whilst the clay was like imperfectly burnt brick, from the heat to which it had been exposed. In the Rev. F. Spurrell's paper upon 'The Early Caves in the Chalk,' read at the annual meeting (1867) of the Kent Archæological Society, much interesting information upon pit-dwellings is given. The use of pits such as those at Highfield, for winter habitations and for granaries, by the ancient Germans, Armenians, and other people is noticed by Mr. Spurrell.

Stone-Boiling.

An account of the various modes of "stone-boiling" practised by different races of savages is given by Mr. Tylor.* The following description will sufficiently explain the process. The Assinneboins cook their food by "stone-boiling." "A hole is dug in the ground about the size of a common pot, and a piece of the raw hide of the animal is put over the hole, and then pressed down with the hands close around the sides, and filled with water. The meat to be boiled is then put in this pot of water; and in a fire, which is made close by, several large stones are heated to a red heat, these are successively dipped and held in the water until the meat is boiled; from which singular and peculiar custom the Ojibbeways have given them the appellation of Assinneboins, or stone-boilers."†

The Indians of the north-west coast of America widen their canoes by stone-boiling; these canoes are "dug out" of the solid trunk of a tree, and must be widened towards the middle to give them breadth and sufficiency of beam. When the "dug-out" is hollowed and shaped, it is filled with water;

* Tylor, 'Early History of Mankind,' pp. 262—269.

† Long after the Assinneboins had been supplied with pots by the traders, they practised this old mode of cooking at public festivals.—Catlin, *l.c.*, vol. i., p. 54. The Mimacs and Souriquois also boil in this way.—Schoolcroft, vol. i., p. 81. See notices of supposed traces of the practice, 'Memoir on Hut-circles in Holyhead Island,' by Hon. W. O. Stanley and Mr. Albert Way, F.S.A.; 'Archæologia Cambrensis,' vol. xiv., third series, pp. 392, 409—413.

red-hot stones are plunged into the water, until it reaches the boiling point; sticks are then forced in between the sides, and the canoe is allowed to cool; this process is repeated again and again until the desired expansion is attained.*

Mr. Albert Way, M.A., F.S.A., has given a modern instance of the practice of stone-boiling, which was communicated to him by the late M. Morlot. "In Carinthia they make a dark brown beer, called Steinbier, by throwing hot stones into the vat or cask; a fact that recalls the account given by Linnæus of Finnish beer, called "Lura," prepared by throwing red-hot stones into the liquor, instead of boiling it."†

In Case D 14, Nos. 1 to 6, are some hand-bricks from Herm, one of the Channel Islands, presented by Mr. J. W. Flower, F.G.S. These objects are supposed by some persons to have been used, instead of stones, as pot-boilers. Similar hand-bricks have been found near Ingoldmells, on the coast of Lincolnshire. They are formed by squeezing a mass of clay in the clenched hand, usually in the left hand. Mr. Franks and Mr. Lukis have suggested that these objects were used as supports for pottery,

* Lord, 'Naturalist in British Columbia,' vol. ii., p. 256. Sproat, 'Scenes and Studies of Savage Life,' p. 87.

Stone-boiling is mentioned in the following amusing tradition, which exists among the Keethratah Indians of British Columbia. In it the story of the first appearance of the white man among them is told: how some Indians in a canoe were out catching halibut, when the noise of a huge sea-monster was heard, plunging along through the thick mist; the Indians drew up their lines, and paddled to shore, when the monster proved to be a boat full of strange-looking men. The strangers landed, and beckoned the Indians to come to them and bring them some fish. One of them had upon his shoulder what was supposed to be a stick; presently he pointed it at a bird that was flying past—a violent poo went forth—down came the bird to the ground. The Indians died! As they revived, they questioned each other as to their state, whether any were dead, and what each had felt. The whites then made signs for a fire to be lighted; the Indians proceeded, at once, according to their usual tedious practice of rubbing two sticks together. The strangers laughed, and one of them, snatching up a handful of dry grass, struck a spark into a little powder placed under it. Instantly another poo!—and a blaze. The Indians died! After this, the new comers wanted some fish boiled; the Indians, therefore, put the fish and water into one of their square wooden buckets, and set some stones on the fire, intending, when they were hot, to cast them into the vessel, and thus boil the food. The whites were not satisfied with this way: one of them fetched a tin kettle out of the boat, put the fish and some water into it, and then, strange to say, set it on the fire. The Indians looked on with astonishment. However, the kettle did not consume; the water did not run into the fire. Then, again, the Indians died!—Mayne's 'British Columbia,' p. 279; see also Sproat, *l.c.*, pp. 54, 61.

† 'Archæologia Cambrensis,' vol. xiv., third series, p. 413.

when placed in the kiln.* Other hand-bricks have been found in the parish of Hale Magna, Lincolnshire.†

A 19.

OBJECTS FROM THE PIT-DWELLINGS AT HIGHFIELD.

Nos. 2, 3 and 4 are nodules of flint which have been used as hammers.

No. 5 is a discoïdal flint implement.

No. 11, 12, and 13 are flint implements.

It is probable that the Highfield pit-dwellings do not strictly belong to the Stone age.

H 6.

GRAIN-RUBBERS.

No. 1 is a grain-rubber, a mere hollowed stone. No. 2 is part of a saddle-shaped grain-rubber or quern, the material used being upper green sandstone.

The "saddle-quern" is a slab of stone, the upper surface of which is hollowed towards the middle, from use in grinding. The grain was probably parched, and then reduced to a coarse powder by a "runner" of stone worked by hand.

Sir S. Baker notices the recent use of this simple form of hand-mill. "I must," says he, "have swallowed a good-sized millstone since I have been in Africa, in the shape of grit rubbed from the *moortraka*, or grinding-stone. The *moortraka*, when new, is a large flat stone weighing about 40 lb. Upon this the corn is ground, by being rubbed with a cylindrical stone with both hands. After a few months' use half of the grinding-stone disappears, and the grit being mixed with the flour, the grinding-stone is actually eaten."‡

The next advance in the form of the hand-mill is when it

* 'Archæological Journal,' vol. vii., pp. 175, 176.

† 'Archæological Journal,' vol. xviii., p. 63.

‡ 'The Albert Nyanza,' vol. i., p. 65. It is well known that the teeth in many of the human skulls exhumed from our tumuli are greatly worn; any admixture of grit from the grindstone with the food would have led to this result. Mr. Lord mentions that the Indians who fish in the Columbia river dry a large number of salmon; whilst drying, silicious sand is blown over the fish, and of course adheres to them. Constantly chewing this "sanded salmon" wears the teeth as if filed down, which Mr. Lord at first imagined them to be, until the true cause was discovered. "I have an under-jaw in my possession, whereon the teeth are quite level with the bony sockets of the jaw, worn away by the flinty sand."—'Naturalist in British Columbia,' by John Keast Lord, F.Z.S., vol. i., p. 75; see also Sproat, *l.c.*, p. 27.

consists of two circular discs of stone, the upper rotating upon the lower by means of a wooden handle inserted in the top stone. This form of quern was "fed" with grain through an aperture in the centre of the upper stone, the meal passing out between the margins of the stones. The upper stone was usually concave and the lower convex, to prevent sliding off, and also to give a fall to the meal.—See H 6, No. 3, which is part of a quern of this kind from the Highfield pits.*

The "pot-quern" is of more complex construction. It consists of a hollowed stone basin, with a smaller circular stone fitting into it. The smaller stone was made to revolve, and the meal escaped through a hole made at the side of the outer stone. —See H 7, No. 2, from Ireland.

Nos. 7 and 8 are fragments of querns from the Highfield pits. No. 9 is a rude pestle which has been used for bruising the grain.

A curious allusion to the quern occurs in the Life of St. Columba, which illustrates its daily use in preparing grain for bread. When the Saint studied under St. Finnian, every night it fell to his share to grind the corn with the quern; he did it so expeditiously that his companions alleged he had always the assistance of an angel in turning the stone, and envied him accordingly.†

In the 'Archæological Journal' is an engraving of a hand-quern of large size. It is copied from an illuminated MS. of the fourteenth century. To the ceiling of the room immediately over the quern is affixed a piece of iron having a hole in it. Near the edge of the upper mill-stone is another hole. In these holes is placed a staff; and then a female, seated beside the apparatus, takes hold of the staff revolving the mill, the iron ring in the ceiling retaining the staff in a vertical position.‡

The more primitive mode of working the hand-mill was by turning the upper stone with a wooden handle; sometimes two handles were used. "Two women sat grinding at the mill," which was placed on the ground between them; with one hand they turned the top stone by means of the handle, either held by both together, or passed from one to the other; with the other hand they poured the grain into the eye or hopper. The old English name for the upper stone was the "rider" or "runner,"

* For saddle-querns found in Anglesey, and other examples, see 'Archæologia Cambrensis,' vol. xiv., third series, pp. 403—407.

† Smith, 'Life of Columba,' p. 60; quoted in Wilson's 'Pre-historic Annals of Scotland,' p. 150.

‡ 'Archæological Journal,' vol. vii., p. 404.

and for the lower, the "lier" or "ass." In Irish the quern was called *Bro*, from the verb *bro*, frangere, to break, to grind.* The use of the quern in Ireland and in Scotland has come down to a very late period. In 1853 Sir William Wilde purchased a stone quern *at work* in the neighbourhood of Clifden, Connemara.†

For comparison with the Highfield specimens, see the other grain-rubbers in the collection.

H 7, No. 1, is a saddle-shaped quern from Ireland.

H 8, No. 1, is a modern stone grain-rubber from New South Wales; it was obtained from the Paris Exhibition (1867). H 7, Nos. 3 and 4, are two stone hand-mills, still in use for grinding corn to make "gofio" or meal, which is the principal and general article of food amongst the poorer classes at Teneriffe. Larger mills, called "tahonas," in all respects, except in size, like the hand-mills, are at this time worked in Teneriffe by camels, mules, or horses. These hand-mills have been obtained for the collection by Mr. George J. Davidson, of Teneriffe, who has furnished the information here given. In the Christy Museum is a modern example from Natal, as well as one in recent use by the Soudan negroes which was in the Egyptian collection in the Paris Exhibition (1867).

H 6, Nos. 4, 5, and 6, are shed antlers of red-deer, portions of which have been sawed off, doubtless for the purpose of being converted into tools, or handles for tools.

B 17.

Objects from the Highfield Pit-Dwellings.

Tablets 1, 2, 3, 5, and 6 exhibit a series of pointed bone tools, some of which show signs of wear, as if they had been used for boring.—(See *a*, *b*, and *c*, tablet 1.)

Upon tablet 4 are three bone dart-heads. Similar objects, attached to the original shafts, in recent use by the Melanesians, are placed in Case E 4, Nos. 19, 20, 22, and 23, and in trophy H 13.

Bone tools are shown on tablet 7.

On tablet 8 is a hook made from the hinge of the jaw of *Bos longifrons*.

On tablet 9 are a bone ring, a portion of a bone needle with drilled eye, and other objects.

On tablets 10 and 11 are bone and horn (red-deer's antler) combs, the teeth of which have been broken off. These imple-

* Wilde, 'Cat. Roy. Irish Academy,' pp. 105, 106.

† Wilde, *l.c.*, p. 108.

ments closely resemble some in recent use by the Esquimaux for scraping fat, &c., from the backs of skins. The Esquimaux tools are made of wood, with the sharp claws of birds lashed to them. In the Christy Museum there are examples of these; in the same collection there is a Basuto tool used for a similar purpose, the short, thick teeth of which are of iron bound to a wooden handle with twisted fibres. These modern implements help us to understand the use of the ancient tools.

A bone comb similar to those exhibited from the Highfield pits was obtained, a few years since, from some curious pits upon Danebury Hill, near Stockbridge, Hants. It was presented to the British Museum by Mrs. Blunt, of Wallop House. Another similar comb was found, in 1853, in a "Pict's house" at Kettleburn, Caithness; it is figured in the 'Archæological Journal.'* Another was found, with a human skull and several heads of the *Bos longifrons*, near the church at Stanwick, in the North Riding of Yorkshire; it was exhibited in the Museum of the Archæological Institute at the York Meeting. Another of these bone combs was found in the Roman Baths at Hunnum, Northumberland. Another exists in the Museum of the Scottish Antiquaries; it is figured in Wilson's 'Pre-historic Annals of Scotland,' p. 424,† and was found in one of those circular fortresses‡ of unhewn stone known as Burghs, in 1825. In Mr. Evans's magnificent collection at Nash Mills is a bone comb resembling those from the Salisbury pit-dwellings; it was obtained from the neighbourhood of Cambridge. Another similar bone comb has been found in Kent's Cavern, Torquay, by Mr. Pengelly, F.R.S. Another of these bone combs, found near Badbury Camp, Dorset, is in the possession of the Rev. J. Austen, of Ensbury, near Wimborne. Bone combs, not however of *precisely* the same form as those already noticed, are figured by Worsaae, 'Nordiske Oldsager,' plate xvii., figs. 82, 83.

On tablet 12 are pieces of bone showing marks of cutting and sawing.

Flint arrow-heads are shown on tablet 13; a flint scraper on tablet 14.

On tablet 15 are some perforated clay balls which have probably served as fly-wheels in spinning. For other ancient examples of spindle-whorls see Cases A 26 and A 27, from Ireland; B 27, from the Swiss lake-dwellings; A 38, from Den-

* 'Archæological Journal,' vol. x., p. 212.

† Vol. ii., p. 106, second edit.

‡ The Burgh of Burghar.

mark; and A 52, from Peru. For specimens in modern use, see Case E 4, Nos. 35 to 37, from Africa. (?)

On tablets 16, 17, and 18 are some pellets of baked clay. A similar object, in both form and material, was found in one of the subterranean chambers at La Tourelle, near Quimper, in Brittany, recently examined and described by M. R. F. Le Men.*

These pellets were doubtless used for slinging; in form they closely resemble the leaden "glandes" (acorns) of the ancients. —See Case E 4, tablet 3 *a*, *b*. Examples of these glandes have been collected from the Plain of Marathon, and other parts of Greece: some of which bear curious inscriptions, such as ΔΕΞΑΙ, "Take this;" or devices, such as thunderbolts. The natives of New Caledonia use sling-stones at the present day of a similar form.—See Cases E 4, tablet 1 *a*, *b*, *c*, and C 41, Nos. 28 to 30. Professor Nilsson figures a similar object from Sweden, 'Stone Age,' plate v., fig. 115, and from New Zealand, plate v., figs. 116, 117.†

The objects upon tablets Nos. 15 and 16 are made of plastic-clay, probably obtained from Clarendon, about three miles distant from the pits. Some of this mottled clay in its unworked state was found in the pits; and large dome-shaped covers perforated with holes, which had apparently been used for ventilation, were also found, made from this same material.

Upon tablets 20, 21, and 23 are pieces of worked bone.

Upon tablet 22, pieces of worked stag's-horn (red deer).

Upon tablet 24 is a bone showing marks of gnawing *c*, and two bones *a* and *b* fractured as if for the extraction of marrow. —See bones similarly fractured from Alliat, Case B 16, tablet 30.

D 11.

All the objects in this Case are from the Highfield pit-dwellings, except No. 1, which is a rude vessel of hand-made pottery found at Petersfinger, near Salisbury. The neighbourhood of Petersfinger abounds with flint flakes, rude tools of flint, and other vestiges of the Stone age. Many specimens from this locality are to be seen in the collection.

Nos. 5, 12, 13, and 14, as well as the entire contents of Case D 12, are specimens of pottery from the Highfield pits, and the trenches there, which latter probably may be referred to a rather later date than the pits. The whole of the pottery from the pits

* 'Archæologia Cambrensis,' vol. xiv., third series.

† See Nilsson's description of slings and sling-stones, pp. 49—53.

is hand-made; it has not been turned on the wheel. Attention is directed to the ornament upon No. 5, Case D 11, and to that upon the specimens shown on tablets Nos. 18 to 23, D 12; also to the red chevron-like ornament upon the specimen mounted on tablet 17 *a*, D 12.

The application of surface-colouring to hand-made pottery is very unusual in this country. The red colour of many of the specimens in Case D 12 does not arise from their having been highly fired: it is due to a direct application of colour.

In Case D 11, Nos. 6, 7, and 8 are oblong lumps of chalk drilled at one end; these have probably served as loom-weights for giving tension to the warp-threads in weaving. Nos. 6 and 8 show wear at the sides of the drilled hole, apparently from the friction of a cord by which they have been suspended. Similar objects made of burnt clay, from the Swiss lake-dwellings, are exhibited in Case C 19, Nos. 11 to 13; and a portion of another specimen found near Shrewton, Wilts, is shown in Case D 13, No. 6. A loom from Denmark, in which the warp threads were strained by having stone weights attached to them, was shown in the Paris Exhibition, 1867.* An ancient stone loom-weight, with drilled hole, was also exhibited from Hungary.

A stone loom-weight, drilled near the lesser end, and worn near the hole, from suspension, was found in the Thames, off Battersea, and is figured in the "Journal of the British Archæological Association," vol. xiv., p. 326.

Two cylindrical weights of baked clay were found with objects apparently British, although of the later times, on the Coombe estate, Kingston Hill, Surrey; they are figured in the Archæological Journal,' vol. xxv. A similar object was found near "Cæsar's Camp," on Wimbledon Common. Weights resembling these English specimens have been met with in some tombs near Kertch, in the Crimea, which have been excavated and described by Dr. M'Pherson.† The use of these objects as "slung-shot" has been suggested.

Bone tools from the Highfield pits are shown on tablets 17 and 18.

Upon tablets 19, 20, 21, 27, and 28 are pieces of stags' horn (red-deer) worked into handles for tools, or, as in 19, showing marks of rude sawing.

* A loom of this kind is figured by Worsaae, 'Nordiske Oldsager,' plate 159 fig. 558.

† Communicated by Mr. Albert Way.

Upon tablet 22 is the shed antler of a roe-deer, which has been slightly worked.

Upon tablet 23 are two spatula-like implements made from rib bones.

Upon tablets 24, 25, and 26 are bones which have been highly polished towards the centre, as if they had been grasped at the ends, and then used for rubbing some (not hard) substance.

In the upper part of the Case are lumps of chalk which have been drilled or otherwise worked; also a number of worked flints.

Modern Use of Stone Tools.

Many persons are loth to believe that rude stone hatchets such as those exhibited have been used for cutting down trees, and still less that planks and boats can have been made with similar tools. It may therefore be well to cite some of the uses to to which tools of stone, bone, horn, and shell have been applied in modern times. The hardest parts of the horns of the wapiti are made into chisels by the Klah-o-quat Indians* (Nootka Sound), with implements of flint. These chisels are used in felling trees, being struck with a heavy stone, having a withe for its handle. The trunk of the tree is cut partly through; the next high wind, and a few blows, bring it to the ground. When down, the lines of the future boat are marked out. Men and women all take their share in the work. Large mussel-shells are sharpened at the edge, and set in withes of tough wood, forming a sort of adze, which is used with one hand or both, according to its size, "and the flying chips show the facility with which the excavation is made in the soft and yielding cedar."†

"The axe used formerly by the natives of Vancouver Island in felling the largest tree, which they did without the use of fire, was made of elk-horn, and was shaped like a chisel. The natives held it as we use the chisel, and struck the handle with a stone not unlike a dumb-bell, and weighing about two pounds. The other instruments used in canoe-making were the gimlet and hand-adze, both of which, indeed, are now generally used. The hand-adze was a large mussel-shell strapped firmly to a wooden handle. In working with the hand-adze the back of the workman's hand was turned downward, and the blow struck lightly inwards towards the workman's body, whose thumb was

* Or Klah-oh-quaht (Sproat).

† Catlin's 'Last Rambles,' chap. iii., pp. 100, 101.

pressed into a hollow in the handle made to receive it. The gimlet, made of bird's bone, and having a wooden handle, was not used like ours; the shaft was placed between the workman's open hands brought close together, and moved briskly backwards and forwards;"* it was, in fact, used as a drill rather than a gimlet.

But the boat-builder of the Stone age has achieved greater results than the manufacture of a "dug-out;" the natives of Otaheite made their boats of planks, using tools of bone and stone only.

"The plank of which these vessels are constructed is made by splitting a tree, with the grain, into as many thin pieces as they can. They first fell the tree with a kind of hatchet, or adze, made of a tough, greenish kind of stone, very dexterously fitted into a handle; it is then cut into such lengths as are required for the plank, one end of which is heated till it begins to crack, and then with wedges of hard wood they split it down; some of these planks are two feet broad, and from fifteen to twenty feet long. The sides are smoothed with adzes of the same materials and construction, but of a smaller size. Six or eight men are sometimes at work upon the same plank together, and, as their tools presently lose their edge, every man has by him a cocoa-nut shell filled with water, and a flat stone, with which he sharpens his adze almost every minute. These planks are generally brought to the thickness of about an inch, and are afterwards fitted to the boat with the same exactness that would be expected from an expert joiner. To fasten these planks together, holes are bored with a piece of bone that is fixed into a stick for that purpose, a use to which our nails were afterwards applied with great advantage."†

Another mode of making canoes is given in Captain Speke's journal:—

"I set out in a long, narrow canoe, hollowed out of the trunk of a single tree. These vessels are mostly built from large timbers, growing in the district of Ugubha, on the western side of the lake. The savages fell them, lop off the branches and ends to the length required, and then, after covering the upper surface with wet mud as the tree lies upon the ground, they set fire to and smoulder out its interior, until nothing but a case

* G. M. Sproat, 'Indians in Vancouver Islands,' 'Trans. Ethno. Soc.,' vol. v., p. 250.

† Wallis's Voyage (Cook), vol. i., chap. viii., p. 267.

remains, which they finish up by paring out with roughly-constructed hatchets."*

Even in more delicate operations than that of boat-building, tools of stone and shell have been applied with success. The following incident occurred in Otaheite:—

"One of our seamen, when he was on shore, run a large splinter into his foot, and the surgeon being on board, one of his comrades endeavoured to take it out with a penknife, but after putting the poor fellow to a good deal of pain, was obliged to give it over. Our good old Indian, who happened to be present, then called over one of his countrymen that was standing on the opposite side of the river, who having looked at the seaman's foot, went immediately down to the beach, and taking up a shell, broke it to a point with his teeth; with this instrument, in little more than a minute, he laid open the place, and extracted the splinter."†

No doubt the time occupied in working out any given result with stone tools must be great, according to our ideas; but time counts for nothing with the savage. The Kamchadals of north-eastern Asia, a race as yet ethnologically isolated, were found by the Kosak invaders using cutting-tools of stone and bone. It is recorded that with these instruments it took them three years to hollow out a canoe, and one year to scoop out one of the wooden troughs in which they cooked their food; but probably a large allowance for exaggeration must be made in this story.‡

ENGLAND.

D 13 AND D 14.

In these Cases the inferior specimens from various parts of England are exhibited.

A 19.

FLINT AND STONE IMPLEMENTS FOUND IN THE NEIGHBOURHOOD OF SALISBURY.

Nos. 7 and 8, found at South Newton, by Mr. J. Sidford, have been used as hammers.

No. 9, found at Bower Chalk, by Mr. G. Sidford, has been used as a hone.

* 'Cruise on the Tanganyika Lake, Central Africa, 1858.'

† Wallis, *l.c.*, vol. i., chap. viii., p. 265.

‡ 'Kracheninnekow,' p. 29. (Quoted in Tylor's 'Early History of Mankind,' p. 207.)

Nos. 14 to 20 were probably used as hatchets. Some of these are unfinished. No. 18, found at Bishopston, by Mr. F. Sidford, is a very fine specimen.

Nos. 21 to 28, unlike the other specimens, have been brought to a smooth surface by artificial rubbing, after having been chipped into form. No. 27, from Tan Hill, near Devizes, presented to the collection by Mr. Coombs, is a good specimen. Nos. 22, 25, and 26, in this Case, and No. 24, A 20, appear to have been broken in use, and were then thrown away, probably because it was too much trouble to regrind the cutting edge.

A 20.

Flint and Stone Implements.—England.

Nos. 1, 2, and 3 are hammer-stones.

No. 4 is a flint-pick.

Nos. 12 and 13, from Burwell Fen, Cambridgeshire, show the object which appears to have led to the use of artificial rubbing. In these specimens the rubbing has been merely for the purpose of removing sharp edges, and with the intention of rendering the implement more comfortable for use in the hand.

No. 15, from Flixton, near Manchester, is a fine specimen.

No. 22, found at North Sway, Hants, by Mr. Adlam, in November, 1868, and presented by him to the collection, is nicely polished.

No. 18 was found in the river Lambourn, Berks, in 1836; it has been presented to the collection by Mr. J. Ellis Jervoise.

A 21.

No. 1 is a flint hatchet of a type peculiar to the county of Norfolk.

No. 2 is part of a stone axe of large size; it was found at Howbeck, near Hesket, Newmarket, Cumberland.

No. 3 is a whetstone drilled for suspension, which has been much used; it was found by Mr. Aldridge at Longdon, Worcestershire, 19th Dec., 1868, and was presented by him to the collection.

C 13 and C 14

Contain flint cores, flint flakes, &c., from the neighbourhood of Salisbury.

B 18

Contains worked flints from the neighbourhood of Salisbury.

Flint scrapers, tablets 5 *c*, *d*, 10 *b*, *d*, 18 *a*, 19 *c*; sling stones, tablets 4, 16, 28 *a*; flint drill, tablet 11, 20 *b*; flint wedges, tablet 21 *a*, 24; flint spear-heads, tablet 3 *b*, 12, 13; many of the flakes show wear, apparently from having been used to scrape some hard substance.—See specimens on tablets 1 *c*, and all on tablet 9. In Case C 41, No. 13, is a throwing-stick from Swan River, New South Wales, at the end of which is a knob of hard gum, placed there to prevent the implement from slipping from the hand. In this gum a piece of flint is imbedded, which exhibits marks of use, similar to those upon the specimens in Case B 18.

B 19.

Upon tablet 2 is a flint flake from South Newton, showing considerable wear at the edges.

Upon tablet 3 are two flint scrapers from South Newton.

Upon tablet 4 is a fragment of hand-made pottery, and a vitreous bead found with remains of an infant at Belmont, near Salisbury.

Upon tablet 5 is a piece of pottery, and part of a drilled bone pin found in a tumulus at Winterslow, near Salisbury, in 1867.

No. 6 *a* is a lozenge-shaped flint arrow-head, and *b* is a flint tool, both found at Catterly Clump, Wilts.

No. 7 *a* is an exquisitely-formed stemmed flint arrow-head, and *b* is a flat flint tool, both found at Pick Rudge Farm, Overton, Wilts, in grubbing up an ash tree on some waste land. These specimens formed part of Mr. Brackstone's collection; Mr. Brackstone obtained them from Mr. Wilkinson, of Bath, to whom they had been given by Mrs. Pamphrey, upon whose farm they were found.

Upon tablets 8 to 14 are flint scrapers and implements from the neighbourhood of Salisbury. Upon tablet 9 *b* is a fine javelin head of flint, from Whitsbury.

Upon tablets 15 to 21 are flint sling-stones, scrapers, and implements from Icklingham, Suffolk.

Sling-Stones and Stones for throwing by Hand.

In addition to sling-stones, a large number of stones to be thrown with the hand alone, appear to have been in use in pre-historic times, as they were with the Romans, and others. The Libyans "use neither Swords, Speares, nor other Weapons, but onely three Darts, and Stones in certaine leather Budgets,

wherewith they fight in pursuing and retyring, and with them they indeavor at the very first to hit their Enemy."*

As regards the use of the sling, "The natives of the Balearic Islands derived their name from βαλλειν, to throw." Strabo says, "With slings they throw large stones better than other people. They attain this dexterity by constant practice from their youth up, for the mothers fix a loaf of bread on the top of a high pole, and the boys must starve until they have hit and knocked down the bread.†

No slingers are mentioned in Homer, nor is there any reference to the use of slings by Herodotus. Slings were used at an early period by the Egyptians. They were employed so late as 1572 by the Huguenots at the siege of Sancerre, in order to save their powder; in so doing they carried out the advice given at a rather earlier period:—

> "Use eek the cast of stone, with slynge or honde,
> It falleth ofte, yf other shot there none is,
> Men harneysed in steel may not withstonde,
> The multitude and mighty cast of stonys;
> And stonys in effecte, are every where,
> And slynges are not noyous for to beare."‡

The following artifice of a slinger to distract the attention of his foe is quoted from Sir William Wilde's 'Catalogue of the Museum of the Royal Irish Academy,' page 77:—

"Cuchullin, in his combat with Cuir Mac Dalot, flung his eight balls high up into the air; and whilst on them his attention was fixed, slung one so dexterously that it struck Mac Dalot's shield, and right through it reached his face. And so great was the force of the ball, that through his head it passed, driving his brains out at the hind part of his fractured skull."§

A stone to be thrown with the hand, from Savage Island, is shown in Case E 4, No. 32. There is some interesting documentary evidence bearing upon the former use of stones for throwing by hand in Ireland.‖

These stones were called *Lia Miledh* (warrior's stone), *Liagh churadh* (a champion's flat stone), *Leacán laechmhileadh* (the

* Diod. Sic., iv., p. 144. 'Done into English by H. C. Gent.' London: 'Sold at the sign of the *Black Spread Eagle*, at the West end of *Pauls*.' 1653.

† Strabo, lib. v., c. 17, 18.

‡ MS. poem of the fifteenth century, Cott. Lib., 'Knyghthode and Batayle,' quoted in Strutt's 'Sports and Pastimes,' pp. 73, 74.

§ Tain-bo-Cuailgne.

‖ Wilde's 'Catalogue of the Royal Irish Academy,' pp. 73, 74.

semi-flat stone of a soldier-champion), and *Liagh-lamhalaich* (a champion's hand-stone). In the record of the battle of the Ford of Comar, near Fore, in the county of Westmeath, which is supposed to have occurred in the century before the Christian era, Lohar's people all came with a champion's hand-stone stowed away in the hollow cavity of his shield. Fergus "put his hand into the hollow of his shield, and took out of it the semi-flat stone of a soldier-champion, and threw a manly cast and struck the hag (a Druidess) on the front of her head, which it passed through, and carried out its own size of the brains at her poll." Eochaidh, son of Enna Ceinnselach, carried his champion's flat-stone in his girdle. Even as late as the tenth century, stones for throwing were used in battle in Ireland.

It is doubtful whether some of the objects we now regard as hatchets may not have been the ancient "champion's flat-stones."

B 19.

Upon tablets 22 and 24 are scrapers, sling-stones, and worked flints from the neighbourhood of Weymouth.

Upon tablets 25 and 26 are a flint-flake and bone tools from Burwell Fen, Cambridgeshire.

Upon tablet 27 is an exquisitely chipped semi-lunar flint tool of rare type, found at Kempston, near Bedford, close to the spot where a flint spear-head of Scandinavian type had been found.

Upon tablet 28 is a stemmed arrow-head of flint, from Cumberland.

Semi-lunar Skin Scrapers.

It is probable that the above-named semi-lunar implement was used for dressing skins, a purpose to which those from Sweden and Denmark, Case 25, Nos. 2 and 8 to 14, may have been applied.

"In Greenland, a bone implement is sometimes used for stretching skins, in order to give them the requisite softness. A stretching implement of iron is still used in some parts of Scania, where the winter dress of the peasantry consists of sheep-skin coats."*

In Iceland, skins to be dressed were pulled to and fro over a ram's-horn serrated on the concave edge, and slung by its two ends from the arm of a tree.† Professor Steenstrup thinks that the semi-lunar flint tools were set in a piece of wood, slung like

* Nilsson, 'Stone Age,' p. 77.

† E. Olafsen, 'Reise ig Island,' 1778, pl. 20, p. 339.

the ram's-horn above named, and that the skins were pulled backwards and forwards over the straight edge of the flint.* Some of the Indians of North America work skins soft by drawing them backwards and forwards over the rounded end of a piece of timber fixed in the ground.†

The late M. Morlot has published the following remarks upon these semi-lunar flint tools :—

"Mais en examinant ces pièces de très près, l'on remarque sur les deux côtés de ce tranchant en scie un fin poli d'un genre particulier, comme un vernis, produit évidemment par le frottement contre un corps trop tendre pour entamer le silex de façon à en effacer les aspérités sensibles de la surface, frottement qui a dû s'exercer transversalement à la direction du tranchant. Cela conduit le professeur Steenstrup à considérer les demi-lunes comme ayant servi à préparer et assouplir des lanières de peau. Dans ce but elles auraient été assujetties par leur tranchant convexe dans un support en bois fixe et ayant le tranchant droit tourné en haut."‡

In the Kempston specimen, so kindly presented to the collection by Mr. James Wyatt, F.G.S., of Bedford, by whom it was found, all the edges had been rubbed down to a smooth surface, but the straight edge alone shows wear.

A 21, B 20 to B 22, and C 15.

Flint Weapons, Tools, and Implements, from the Yorkshire Wolds and Tumuli.

A 21.

The specimens in this Case, Nos. 4 to 31, are from Bridlington, Yorkshire.

Nos. 4 to 13 are stone and flint balls and rude tools, many of which have been used as hammers. Nos. 4, 5, and 6 are good examples. No. 14 is a seaside pebble which has been roughened artificially in the middle on both sides, to give a firmer hold to the operator, who probably held the implement between his thumb and first finger. The blows have been struck with the pointed ends, which are much bruised. For similar hammerstones from Ireland, see Case A 26, Nos. 6, 7, and 8; from France, Case A 30, No. 28.

Nos. 18 to 28 are hatchets of flint and stone.

Nos. 30 and 31 are fragments of drilled stone axes.

* Communicated by Mr. T. Rupert Jones, F.G.S.

† John D. Hunter, 'Indian Tribes,' Philadelphia, 1823, p. 295.

‡ 'L'Archéologie du Mecklenbourg,' p. 27.

C 15.

All the specimens in this Case are from Bridlington, Yorkshire.

Upon tablets 1 to 8 are flint flakes showing little work.

Upon tablets 10 to 15 are flint wedges, some of which are brought to a pointed end, others to a straight edge. Many of these show bruising at the broad end, probably from having been struck with a mallet when used. See tablets 12 *a* and 13 *b*.

B 20.

All the specimens in this Case are from Yorkshire.

Many of them were found by Mr. Charles Monkman, of Malton, by whom they have been presented to the collection.

Upon tablets 1 to 5 are worked flints, chiefly scrapers, from Ganton Wold.

Upon tablets 6 to 9 are similar objects from Langton Wold.

Upon tablets 10 to 12, similar from Heslerton Wold.

Upon tablets 13 and 14, others from Willerby Wold.

Upon tablet 15, others from Sherburn Wold.

Upon tablets 16 to 18, others from Amotherby tumuli.

Upon tablet 19, others from Scamridge.

Upon tablet 20, others from Pickering.

Upon tablets 21 to 24, others from Bridlington.

Flint saws are shown upon tablet 21.

A nicely-finished flint chisel is shown on tablet 24 *a*.

B 21.

All the specimens in this Case are from Yorkshire, and chiefly from Bridlington.

Flint scrapers are shown upon tablets 1 to 19. Among the many good specimens exhibited may be noticed tablet 14 *a*, tablet 16 *b*, and tablet 17 *a* and *b*.

Upon tablets 20 and 21 are some semi-lunar flints resembling the scrapers found at Le Moustier, Dordogne (see Case B 11, Nos. 8 to 10). No. 20, however, is possibly merely a fragment of some larger implement.

Upon tablets 24, 25, 26, 27, and 28 are worked flints of undetermined use.

B 22.

All the specimens in this Case are from Yorkshire, and chiefly from Bridlington.

Upon tablets 1 to 5, 9, 10, and 15 are leaf-shaped flint arrow-heads.

Upon tablets 6, 7, and 8 are triangular flint arrow-heads. Some archæologists think that such specimens as *a* tablet 8 were used for knives.

Upon tablets 15 and 16 are stemmed flint arrow-heads.

Upon tablets 11 to 14 are flint tools, many of which have been used for drilling, and show wear.—See tablet 12 *c*.

Upon tablets 18 to 20 are flint flakes, quite unworked upon the under side, but carefully chipped upon the upper surface.

Upon tablet 21 are flint spear-heads.

Upon tablets 25 to 28 are flint implements which only show traces of wear at the points, and which may have been used for flaking flint by *pressure*, in contradistinction to the process of flaking it by *percussion* in the ordinary way.

The specimens on tablet 8 exhibit such parallel flaking (ripple work) that it is difficult to believe it possible to remove flakes with sufficient precision by blows given with a hammer or other tool.

The modes of flaking, both by *pressure* and by *percussion*, are practised in modern, no less than they were in ancient times.

Methods of Making Flint and Stone Arrow-heads and Implements.

An account of the modern manufacture of obsidian arrow-heads by *percussion*, by the Shasta Indians of California, has been given by an eyewitness.

"The Indian seated himself on the floor, and laying the stone anvil upon his knee, with one blow of his agate chisel he separated the obsidian pebble into two parts; then, giving a blow to the fractured side, he split off a slab a quarter of an inch in thickness. Holding the piece against his anvil with the thumb and finger of his left hand, he commenced a series of continuous blows, every one of which chipped off fragments of the brittle substance. It gradually seemed to acquire shape. After finishing the base of the arrow-head (the whole being little over an inch in length), he began striking gentle blows, every one of which I expected would break it in pieces. Yet such was his adroit application, his skill and dexterity, that in little over an hour he produced a perfect obsidian arrow-head.

"I then requested him to carve one from the remains of a broken bottle, which, after two failures, he succeeded in doing.

He gave as a reason for his ill-success that he did not understand the grain of the glass. No sculptor ever handled a chisel with greater precision, or more carefully measured the weight and effect of every blow, than did this ingenious Indian; for even among them arrow-making is a distinct profession, in which few attain excellence. In a moment, all I had read of the hardening of copper for the working of flint axes, &c., vanished before the simplest mechanical process."*

Mr. T. R. Peale, of the Scientific Corps, United States Exploring Expedition, witnessed the making of arrow-heads among the Shasta and North California Indians. He says that the flakes were struck off from the mass of jasper, agate, or chalcedony, by a blow with a round-faced stone, and that the edges were chipped by the application of a notch in a piece of horn, as a glazier chips glass. The notches in the horn tool were of different sizes and depths, in order to suit the work to be done.

Schoolcraft† thus describes the mode of making flint arrow-heads by the North American Indians:—

"The skill displayed in this art, as it is exhibited by the tribes of the entire continent, has excited admiration. The material employed is generally some form of horn-stone, sometimes passing into flint. This mineral is often called chert by the English mineralogists. No specimens have, however, been observed where the substance is gun-flint. This horn-stone is less hard than common quartz, and can readily be broken by contact with the latter. Experience has taught the Indian that some varieties of horn-stone are less easily and regularly fractured than others, and that the tendency to a conchoidal fracture is to be relied on in the softer varieties. It has also shown him that the weathered or surface fragments are harder and less manageable than those quarried from the rocks or mountains.

"To break them, he seats himself on the ground, and holds the lump on one of his thighs, interposing some hard substance below it. When the blow is given, there is a sufficient yielding in the piece to be fractured, not to endanger its being shivered into fragments. Many are, however, lost. After the lump has been broken transversely, it requires great skill and patience to chip the edges. Such is the art required in this business, both

* See 'Reliquiæ Aquitanicæ,' p. 17. Caleb Lyon, 'Bull. American Ethno. Soc.,' Dec. 1860, p. 39.

† Schoolcraft, 'Indian Tribes of the U.S.A.,' vol. iii., p. 467.

in selecting and fracturing the stones, that it is found to be the employment of particular men, generally old men, who are laid aside from hunting, to make arrow and spear heads.

"The Aztecs and Peruvians generally employed obsidian for this purpose, which they quarried from the volcanic mountains. It is found that the tribes of Oregon and California also employ this delicate glassy substance, in the preparation of which they evince the greatest skill. Nothing can exceed the art of some of the California arrows which have been recently examined.* And the wonder increases when it is seen that these tribes are, in other respects, quite inferior in their intellectual character and habits of subsistence and life to the Mississippi valley and prairie Indians who inhabit the plains east of the Rocky Mountains."

The following account may apply to flaking by *pressure*, as the above does to flaking by *percussion*. It occurs in the 'Voyages and Discoveries of Captain John Smith in Virginia: Sixth Voyage, 1606.' Speaking of the Indians of Virginia, he says, "His arrowhead he quickly maketh with a little bone, which he ever weareth at his bracept, of a splint of a stone or glasse in the form of a heart, and these they glew to the end of their arrowes."

The ancient method of flaking by *pressure* by the Aztecs has been thus described:—

"Some of the old Spanish writers on Mexico give a tolerably full account of the manner in which the obsidian knives, &c., were made by the Aztecs.

"Torquemada says † (free translation),—

"'They had, and still have, workmen who make knives of a certain black stone or flint, which it is a most wonderful and admirable thing to see them make out of the stone; and the ingenuity which invented this art is much to be praised. They are made and got out of the stone (if one can explain it) in this manner: One of these Indian workmen sits down upon the ground and takes a piece of this black stone, which is like jet, and hard as flint, and is a stone which might be called precious, more beautiful and brilliant than alabaster or jasper, so much so that of it are made tablets and mirrors. The piece they take is about eight inches long, or rather more, and as thick as one's leg or rather less, and cylindrical; they have a stick as large as the shaft of a lance, and three cubits, or rather more, in length,

* See Nos. 16 to 24 and 43 to 50, Case E 3.

† 'Monarquia Indiana,' Seville, 1615.

and at the end of it they fasten firmly another piece of wood eight inches long, to give more weight to this part; then pressing their naked feet together, they hold the stone as with a pair of pincers or the vice of a carpenter's bench. They take the stick (which is cut off smooth at the end) with both hands, and set it well home against the edge of the front of the stone,* which also is cut smooth in that part; and then they press it against their breast, and with the force of the pressure there flies off a knife, with its point and edge on each side, as neatly as if one were to make them of a turnip with a sharp knife, or of iron in the fire. Then they sharpen it on a stone, using a hone to give it a very fine edge; and in a very short time these workmen will make more than twenty knives in the aforesaid manner. They come out of the same shape as our barbers' lancets, except that they have a rib up the middle, and have a slight graceful curve towards the point. They will cut and shave the hair the first time they are used, at the first cut nearly as well as a steel razor, but they lose their edge at the second cut; and so to finish shaving one's beard or hair, one after another has to be used; though indeed they are cheap, and spoiling them is of no consequence. Many Spaniards, both regular and secular clergy, have been shaved with them, especially at the beginning of the colonisation of these realms, when there was no such abundance as now of the necessary instruments, and people who gain their livelihood by practising this occupation. But I conclude by saying that it is an admirable thing to see them made, and no small argument for the capacity of the men who found out such an invention."

"Hernandez† gives a similar account of the process. He compares the wooden instrument used to a crossbow. It was evidently a T-shaped implement, and the workman held the cross-piece with his two hands against his breast, while the end of the straight stick rested on the stone. He furthermore gives a description of the making of the well-known *maquahuitl*, or Aztec war-club, which was armed on both sides with a row of obsidian knives, or teeth, stuck into holes with a kind of gum. With this instrument, he says, a man could be cut in half at a blow—an absurd statement which has been repeated by more modern writers."‡

Admiral Sir E. Belcher gives an account of the manufacture of flint arrow-heads by the Western Esquimaux tribes, at and

* Y ponenlo avesar con el canto de la frente de la piedra.

† 'Rerum Med. Nov. Hisp. Thes.,' Rome, 1651.

‡ Quoted by Tylor, 'Anahuac,' p. 331.

north of Icy Cape, the serrated edges of which are produced by *pressure.**

"Cape Lisburne is about sixty feet in height, composed of a greyish dolomite, in which many fossil encrinites, corals, and crustacea are found. Near the base, about four feet above the sea-level, a vein of chert is found, on which this friable stone lies. It varies from about nine inches inland (as exposed) to about three or four inches as it is lost in the gravelly beach. It is broken in vertical shivers, or conchoidal plates, by a slight tap with the hammer (formed of a very stubborn jade or nephrite), the splinters affording a ringing sound like glass or pottery. The fragments, indeed, in many instances were already sufficiently formed without human aid for the ordinary purposes of flaying or skinning the superfluous fat from hides, &c.; indeed, it then occurred to me that many fragments, where nature seemed either to have pressed heavily or acted by frost, were so splintered and almost formed by nature to be used as arrow or spear heads without further attention to chipping. But to the *process* which they pursue in effecting the fine regular serrated edges of their flint arrow-heads.

"Possibly, had I not witnessed the operation, and been at the time one of the first Europeans with whom they ever had communion, the idea would have remained undisputed that they owed their formation to the stroke of the hammer. Being a working amateur mechanic myself, and having practised in a very similar manner on glass with a penny-piece in 1815, I was not at all surprised at witnessing the *modus operandi.* Selecting a log of wood, in which a spoon-shaped cavity was cut, they placed the splinter to be worked over it, and by pressing gently along the margin vertically, first on one side, then on the other, as one would set a saw, they splintered off alternate fragments until the object thus properly outlined presented the spear or arrow-head form, with two cutting serrated sides.

"But let us revert to this instrument, for the use of which the untaught would *never imagine a purpose*, and, I suspect, was not witnessed or deemed worthy of notice by any other individual of the expedition.

"First, this instrument has a graceful outline. The handle is of fine fossil ivory. That would be too soft to deal with flint or chert in the manner required. But they discovered

* 'Transactions of the Ethnological Society,' New Series, vol. i., part 2, 1861, p. 138.

that the point of the deer-horn* is harder, and also more stubborn; therefore, in a slit, like lead in our pencils, they introduced a slip of this substance, and secured it by a strong thong, put on *wet*, but which on drying becomes very rigid. Here we cannot fail to trace ingenuity, ability, and a view to ornament. It is the point of deer-horn which, refusing to yield, drives off the fine conchoidal splinters from the chert.

"I cannot here omit remarking that the very same process is pursued by the Indians of Mexican origin in California with the obsidian points for their arrows; and also in the North and South Pacific, at Sandwich Islands (21° north), and Tahiti (18° south),—39° = 2340 miles asunder—similar indentations or chippings are carried out in forming their axes from basaltic lava, but probably performed in the latter instances with stone hammers. I myself witnessed at the convent of Monterey the captured Indians forming their arrow-heads out of obsidian exactly similar to the mode practised by the Esquimaux."

A specimen of the implement referred to by Sir Edward Belcher is exhibited in Case E 3, No. 15. In this instance the flaking point is made of bone, and not of reindeer antler.

A mode of flaking by using a punch is mentioned by some travellers. Catlin† thus describes the mode adopted by the Apachees in making flint arrow-heads:—

"Like most of the tribes west of and in the Rocky Mountains, they manufacture the blades of their spears and points for their arrows of flints, and also of obsidian, which is scattered over those volcanic regions west of the mountains; and, like the other tribes, they guard as a profound secret the mode by which the flints and obsidian are broken into the shapes they require.

"Every tribe has its *factory*, in which these arrow-heads are made, and in those, only certain adepts are able or allowed to make them, for the use of the tribe. Erratic boulders of flint are collected (and sometimes brought an immense distance), and broken with a sort of sledge-hammer, made of a rounded pebble of horn-stone, set in a twisted withe, holding the stone, and forming a handle.

"The flint, at the indiscriminate blows of the sledge, is broken into a hundred pieces, and such flakes selected as, from the angles of their fracture and thickness, will answer as the basis of an arrow-head.

* "Wherever 'horn' is named, it refers to the hard point of the antler of the reindeer."

† Catlin, 'Last Rambles amongst the Indians,' chap. v, pp. 187—190.

"The master workman, seated on the ground, lays one of these flakes on the palm of his left hand, holding it firmly down with two or more fingers of the same hand, and with his right hand, between the thumb and two fore-fingers, places his chisel (or punch) on the point that is to be broken off; and a co-operator (a striker) sitting in front of him, with a mallet of very hard wood, strikes the chisel (or punch) on the upper end, flaking the flint off on the under side, below each projecting point that is struck. The flint is then turned and chipped in the same manner from the opposite side, and so turned and chipped until the required shape and dimensions are obtained, all the fractures being made on the palm of the hand.

"In selecting a flake for the arrow-head, a nice judgment must be used, or the attempt will fail: a flake with two opposite parallel, or nearly parallel, planes is found, and of the thickness required for the centre of the arrow-point. The first chipping reaches near to the centre of these planes, but without quite breaking it away, and each chipping is shorter and shorter, until the shape and the edge of the arrow-head are formed.

"The yielding elasticity of the palm of the hand enables the chip to come off without breaking the body of the flint, which would be the case if they were broken on a hard substance. These people have no metallic instruments to work with, and the instrument (punch) which they use, I was told, was a piece of bone; but on examining it, I found it to be a substance much harder, made of the tooth (incisor) of the sperm-whale, which cetaceans are often stranded on the coast of the Pacific. This punch is about six or seven inches in length, and one inch in diameter, with one rounded side and two plane sides; therefore presenting one acute and two obtuse angles, to suit the points to be broken.

"This operation is very curious, both the holder and the striker singing, and the strokes of the mallet given exactly in time with the music, and with a sharp and *rebounding* blow, in which, the Indians tell us, is the great *medicine* (or mystery) of the operation."

What Catlin has said with reference to a *rebounding* blow is perfectly true; it is impossible to flake flint with a dull, heavy, smashing blow; it is the measured and rebounding blow—a shock rather than a blow—which, given with judgment, enables the material to take its own line of cleavage, and produces what is so well known as the conchoidal fracture. It is the presence of this conchoidal fracture, resulting from human

skill, that distinguishes the mere splinter of flint from the flint flake; and it is the repetition of this operation twenty or thirty times around the edges of those flint implements found in the *drift* that stamps them as proofs of human handiwork.

At the recent meeting of the International Congress of Prehistoric Archæology at Norwich (1868), Mr. John Evans made flint scrapers and tools by *pressure* as well as by *percussion*, demonstrating the possibility of accomplishing the work by both methods. The tool used by Mr. Evans for flaking by pressure was a piece of stag's horn, having a chisel edge.

Professor Nilsson, like Mr. Evans, has given his personal experience of the working of flint with stone tools. He tells us:—

"I never bought my gun-flints, because, when a boy, I used a small gun, which no purchased flints would fit. Besides the screw of the cock was fixed in such a manner that I was obliged to knock a semi-circular notch into the back of the flint for the reception of the screw, in order to hold the flint firmly. For this reason I always chipped the flints myself, generally while on my shooting excursions, which I then made in the south of the province of Scania, where flint-stones are abundant. Whenever in want of a gun-flint, I first selected a large flint; I then looked out for a boulder of a suitable size, and of compact hard granite, or quartz-sandstone; with this I split the flint into flakes, more or less thin, and of course with sharp edges. Having selected one or more splinters suitable for my purpose, I went to a large-sized granite stone, using it as a support for the splinter, which I held in my left hand, while with my right, in which I held the hammer-stone, I managed, by means of some projecting corner or blunt point of the same, to chip the edges of the splinter into a gun-flint of the desired form. Lastly, I knocked out the notch for the screw in the back of the flint. But it was of the utmost importance that, during the operation, the point of the splinter on which I was operating should rest upon the support, as otherwise the splinter would instantly break. My habit of shaping the flint in this way, by means of a piece of granite or quartz-sandstone, enabled me at once to recognise the stone hammer which the aborigines of Scandinavia made use of to chip out their flint implements. . . . . Necessity taught *me* this art, and necessity was also the teacher of the first inhabitants of Sweden."*

* Nilsson, 'Stone Age of Scandinavia,' p. 7.

Mr. Evans long since suggested that the flint implements found in the drift had been formed by blows given with a rounded pebble, but he did not give this opinion until he had himself reproduced some of the forms in flint, with such a hammer.*

FLINT AND STONE HATCHETS, ARROW-HEADS, AND IMPLEMENTS FROM IRELAND ARE EXHIBITED IN CASES A 22 TO A 27, AND B 23 TO B 25.

B 23.

TRIANGULAR FLINT ARROW-HEADS.

Triangular flint and stone arrow-heads are shown on tablets 1 to 9. It will be observed that Sir William Wilde's *two* first classes of arrowheads are included in this series—the "triangular," and the "triangular hollowed out at the base."†

Attention is directed to the fineness of the surface chipping upon many of these specimens—such as *e*, tablet 8; to the serration of edge, as in *i*, tablet 5; to the extreme correctness of outline, as in *g*, tablet 3; and to the great difficulty which must have arisen in manipulating such small specimens as *d* and *f*, tablet 8.

Upon tablets 10 and 13 are shown flint-flakes which have been carefully chipped upon the upper surface, the under surface being unworked. Similar specimens are exhibited from Yorkshire, in Case B 22, tablets 18 to 20.

Flint spear-heads and implements are shown upon tablets 14 to 19.

Flint cores, or *nucleï* (blocks from which flakes have been removed) are shown on tablet 22. Flint tools which have been used for scraping are shown on tablet 23; *b* is much worn. A disc of flint *a* is shown on tablet 20. Similar flint discs from Yorkshire are shown in Case B 21, tablet 27, and an obsidian disc from Mexico, Case B 30, tablet 12 *d*; *b*, tablet 20, is a flint scraper.

B 24.

STEMMED FLINT ARROW-HEADS.

Stemmed flint and stone arrow-heads are shown on tablets 1 to 21. Sir William Wilde's "barbed" arrow-heads are included

* Archæologia, vol. xxxvii.

† 'Cat. Mus. Royal Irish Acad.,' pp. 19, 20.

with his "stemmed" class in this series.* The specimens *c*, tablet 16, and *d*, tablet 19, are much patinated; *f*, tablet 10; *e*, tablet 11; *a*, *b*, and *c*, tablet 13; and *e*, tablet 15, are serrated at the edges.

The arrow-head *c*, tablet 18, is indented on both sides, as if to afford greater security in fastening it to the shaft. For modern illustrations of the mode of attaching flint and obsidian arrow-heads to the shaft by the Pimo Indians, living on the banks of the Gila river in Arizona, about 130 miles from the Colorado river of California, see Case E 3, Nos. 16 to 24 and 43 to 50. Nilsson gives figures of such arrows from California.†

In Case E 3, Nos. 1 to 5 are examples of stemmed flint arrow-heads attached to the shaft in recent use by the Esquimaux of Behring's Straits.

B 25.

LEAF-SHAPED FLINT ARROW-HEADS.‡

Leaf and lozenge-shaped arrow-heads are shown on tablets 1 to 16; the surface chipping upon some of the specimens is remarkable, see *b* and *c*, tablet 1, *f*, tablet 2, all upon tablet 4, and *a* and *b*, tablet 5. Some of the specimens were artificially rubbed, after having been chipped, such as *a*, *b*, *d*, and *e*, tablet 7, and *a*, tablet 8. Upon tablet 19 is a flint spear-head.

In Cases B 23 to B 25 many flint flakes will be noticed from different countries. These objects were probably seldom used unmounted. A flake of grey flint was, however, found in the bed of the river Bann, at Toome Bridge, between the counties of Antrim and Derry, which had one end wrapped round with moss (*Hypnum brevirostre*), intended apparently as a substitute for a handle. This unique specimen is in the collection of Lord Talbot de Malahide. It was shown in the Paris Exhibition (1867); M. Gabriel de Mortillet rather severely remarked that it was carefully enclosed in a glass bottle, and that it appeared to him to be unfitted for examination with the eye of a critic.§

Flint flakes were doubtless often mounted as points to spears or arrows; flakes of obsidian are still used in New Caledonia and elsewhere for a similar purpose.—See specimens in Cases C 40 and E 3.

* Wilde's 'Cat. Mus. R. I. A.,' pp. 20—22.

† 'Stone Age,' plate v., figs. 104, 105.

‡ Wilde's 'Cat. Mus. R. I. A.,' pp. 22—27.

§ 'Promenades Préhistoriques à l'Exposition Universelle,' p. 153.

Folk-lore.

Stone "spindle whorls" are called "fairy millstones" and "pixy wheels," and flint arrow-heads are known as "elf darts" by the Irish and Scotch peasantry.* In Cornwall stone spindle-whorls are termed "pixy grinding stones." It is popularly believed when cattle are sick that they have been stricken by these fairy or elfin weapons.

> "There ev'ry herd by sad experience knows,
> How, wing'd with fate, their elf-shot arrows fly,
> When the sick ewe her summer food foregoes,
> Or stretch'd on earth the heart-smit heifers lie."†

The cattle doctor feels the animal over, and does not fail to find one or more "elf darts" in its skin. These are placed in the water which is given to the creature to drink, and the cure is, of course, speedily effected. Allan Ramsay, in his poems,‡ explains "elf shot" thus:—"Bewitch'd, shot by fairies. Country people tell odd tales of this distemper amongst cows. When elf-shot, the cow falls down suddenly dead; no part of the skin is pierced, but often a little triangular flat stone is found near the beast, as they report, which is called the elf's arrow." In Norway, certain diseases are known as *Alfskot*, and in Denmark *Elveskud*, that is "elf shot," showing the prevalence of the superstition. Even in Japan, flint and obsidian arrow-heads are regarded as the weapons still in use by spirits. The popular belief there is, that every year an army of spirits fly through the air with rain and storm; when the sky clears, the people go out and hunt in the sand for the stone arrow-heads the spirits have dropped. Dr. Jannsen states that the Japanese keep ancient stone implements in their chapels, treating them with religious veneration. According to Dr. Schwaner ancient stone hatchets are still most carefully preserved by the present inhabitants of Borneo in bags, woven of cane and suspended in the recesses of their dwellings among their talismans and amulets.§

Flint arrow-heads were regarded as most potent spells against the influence of witchcraft and the evil eye, and were

* Brand, 'Popular Antiquities,' vol. ii., pp. 489,—491. Sinclair, 'Statistical Account of Scotland,' i., p. 73; iii. p. 56; x. p. 15; xxi. p. 148.

† Collins' 'Ode on the Popular Superstitions of the Highlands of Scotland,' p. 10.

‡ Published 1721, p. 224.

§ 'Archæological Journal,' vol. xi., p. 123.

accordingly worn as amulets, either set in silver or simply sewn into the dress. "What the peasants in Ireland call an elf-arrow is frequently set in silver, and worn about the neck as an amulet against being elf-shot."* In the collection of the Society of Antiquaries of Scotland is an "elf-dart," set in silver, which has been worn as an amulet. In the same collection are four stone spindle-whorls, used in the island of Lewis as charms against the diseases of cattle; a stone, pierced with two holes, at one time used a charm in Islay, Argyllshire; and another, formerly used as a charm in Athole, Perthshire. A flint arrow-head forms the central pendant of a Greek or Etruscan gold necklace in the British Museum.†

It is still more curious to find that the Arabs of the present day make miniature arrow-heads of red cornelian, which they wear round the neck as charms, and as being good for the blood.‡

A foe, even when protected by magical power, was not proof against a wound inflicted by a flint arrow-head. Örvar Odd slew Gyda with flint-tipped arrows, although she had previously stopped the iron-tipped arrows he had shot at her with the palm of her hand, upon which they made no more impression than upon a stone.§

The ram, or goat, acting as the "leader of the flock," carried an ancient stone hatchet around its neck, suspended there by the shepherd to ward off the baneful effects of the evil eye from the entire flock. A specimen much worn, from having long served this purpose, is in the fine collection of pre-historic antiquities formed by Mr. F. Corbin Lukis, F.S.A., of Guernsey.

Superstition is constantly seeking to explain that which, from lapse of time or other causes, has passed away from general remembrance. Thus the traces of ancient cultivation in hilly parts of Galloway, known as elf-furrows, are still popularly believed to indicate the spots tilled when the Pope cursed the land of Scotland, and it became barren; by some strange oversight his Holiness forgot to curse the hills, and the people

* Vallancey's 'Collectanea de Rebus Hibernicis,' No. xiii., description of plate ii.

† Franks, in 'Horæ Ferales,' p. 136.

‡ 'Man and his Earliest Known Works;' a Paper read by Mr. John Evans, F.R.S., at the opening of the Blackmore Museum. Pub. 'Wiltshire Archæological and Nat. Hist. Mag.,' vol. xi., No. xxxiii.

§ 'Forn-Aldar Sögur Nordlanda,' Copenhagen, 1829. Nilsson, 'Stone Age of Scandinavia,' pp. 197—199.

therefore endeavoured to raise a scant crop of grain upon those unpromising heights.*

If flint arrow-heads were regarded as "elf-darts," stone hatchets were equally believed to be thunderbolts. In Greece they are known as *astropelekia*, or axes that fall from the stars. So early as the time of Pliny they were known as thunderbolts. Pliny, quoting Sotacus, says there were two sorts of *ceraunia*—to wit, the "black and the red, saying they do resemble halberds or ax-heads, such as be round withal are endued with this virtue, that by meanes of them cities may be forced and whole navies at sea discomfited." Aldrovandus, in 1607, quotes Gesner, and describes instances where these stones have been found under the roots of trees which have been struck by lightning. Gesner gives drawings of two of these stones, one of which was found in the cellar of a house which had been struck with lightning; the other passed through an oak tree, and was found beneath its roots. Both these stones are perforated, and Gesner gravely discusses how such perforation could take place in matter generated in the clouds! The Brazilians call stone hatchets *corísco*,†—that is, "lightning," "thunderbolt."

In Java, China, Brazil, Germany, France, Italy, Spain, and elsewhere, stone hatchets are still believed to be thunderbolts; and have sometimes been preserved in families for centuries, on account of their valuable properties. "They preserve from thunder, are good for diseases of man and beast, increase the milk of cows, and powder scraped from them may be taken internally for childish disorders."‡ According to the popular belief in the north of Europe, the lightning is accompanied by a "thunderstone," which penetrates into the earth as far as the highest church steeple is long; but this stone rises towards the surface every time it thunders, and at the expiration of seven years again makes its appearance on the earth. Every house in which such a stone is preserved is secure from the effect of thunderstorms, on the approach of which it begins to sweat.§ So late as in 1865, Mr. Evans when in Ireland heard

* 'Sinclair's Stat. Acc.,' xvii. p. 115; see also Wilde, 'Cat. Mus. Royal Irish Academy,' p. 19; Wilson, 'Pre-Historic Annals of Scotland,' pp. 123—126.

† Latin, *coruscare.*

‡ Evans, 'Man and his Earliest Known Works.'

§ Thorpe, 'Northern Mythology,' vol. i., p. 54, note; vol. iii., p. 57. Grimm, D.M., pp. 163—165. The same idea seems expressed by the myth that Thor's hammer always returns to his hand.—See Thorpe, *l.c.*, p. 39.

of a stone hatchet which was being sent round among neighbours, to be placed in troughs from which cattle drank, in order to preserve them from disease. In India stone hatchets are often preserved in temples, and are adorned with red paint, as *mahadeo*, or sacred.*

Some philosophers have regarded stone axes as iron implements petrified from long lying in the ground.

It is probable that the *victory-stones* worn by Scandinavian warriors, were ancient stone implements or weapons; clearly, however, they were worn, like them, as amulets.

In Didrik of Bern's Saga, chapter xxv., it is related that King Nidung gathered a large warlike host, with which he marched against his enemies. He was only one day's march distant from the hostile army, expecting to do battle on the following day, when he discovered that he had forgotten his *victory-stone*, which he had left at home. This stone was an heirloom in his family, having passed from father to son during many generations, and it possessed the virtue of ensuring victory to him who carried it in the fight. The king, dreading to lose the battle if he had not his victory-stone about him, especially as his army was weaker in numerical force than his adversary's, promised the hand of his daughter, together with a third of his kingdom, to him who should bring him this valuable stone before the commencement of the battle. Valent, the armourer, rode back to fetch the stone; he gave it to the king, who thereupon attacked the enemy and won the battle.

In the ninety-sixth chapter of this Saga, there is a still more elucidative narrative concerning such a *victory-stone*. Ditlew, a youthful champion from Tumatorp, in Scania, encountered an old warrior, Sigurd by name, in single combat. Towards evening Sigurd became fatigued, and observed that he had left his victory-stone at home. He therefore invited Ditlew home with him to spend the night in his house, so that they might continue the fight on the following day. Here Ditlew made the acquaintance of Sigurd's brave daughter, Gunhild, and they forthwith fell in love with each other. Old Sigurd, as soon as he entered his house, *hung his victory-stone round his neck;* but having drunk deeply during the night, he fell into a heavy sleep. Gunhild then stole the stone from her father, and gave it to her sweetheart. When the combat was renewed on the following day,

* Le Mesurier, in 'Journ. As. Soc. Bengal,' 1861, No. 1, p. 81; Theobald, 'As. Soc.,' April, 1864, &c.

Sigurd received three wounds, whereupon he owned himself vanquished.*

M. Gabriel de Mortillet has stated that in a tumulus opened in Flanders by M. Joly, six ancient stone hatchets were found placed on end in a circle around the interment. The difference in the age of these specimens, as indicated by the patina upon them, has induced the belief that they had been collected from the surface, and were placed in the tumulus as amulets.†

A 22.

Stone Hatchets.

In Cases A 22 to A 24 stone hatchets from Ireland are exhibited. Such small specimens as Nos. 13 to 16 can only be regarded as chisels. No. 8 shows good workmanship. No. 20 has been used as a hone as well as a hatchet. No. 3, Case D 15, from Carnac, Brittany, has been applied to the same double purpose.

A 23.

Attention is directed to the bluntness of the edge of No. 8; in its present state it is perfectly useless as a cutting tool. Other examples of these blunt implements are in the collection; they do not appear to have become blunted in use, but some, at least, have been purposely rubbed down at the edge to *prevent* their cutting. See No. 1, Case 25, and No. 9, Case 26, both from Ireland, No. 1, Case 43, from Ohio, U.S.A., and more particularly No. 16, Case 45, from Missouri, U.S.A., which has been rubbed down purposely to a flat surface three-eighths of an inch wide at the broad end—the cutting part of ordinary stone hatchets. There is a remarkable bluntness at the edges of Nos. 6 and 8, Case A 32, and of Nos. 13 and 29, Case A 33, which cannot have arisen either from weathering or use.

Many of the stone hatchets exhibited were probably used unmounted. No. 4 in this Case, however, was evidently intended for hafting, as the space towards the middle has been left rough where it would have been bound to the handle; all other parts were rubbed to a smooth surface. See also a similar instance in Case A 30, No. 9, from Toulouse, France. Wilson

* Quoted from Nilsson's 'Stone Age of Scandinavia,' pp. 215, 216.

† 'Proceedings of the International Congress of Pre-historic Archæology,' Paris, 1868, p. 119.

mentions that an unpolished band of this kind exists around a greenstone hatchet found in 1780 near the Clyde.*

Stone hatchets in their original wooden handles have been found in Ireland. Such a specimen is in the collection of Colonel A. Lane Fox, F.S.A.

A 24.

The elegant form of Nos. 8 and 9 may be noticed.

A 25.

Flint and Stone Hatchets and Tools.

No. 2 appears to have been narrowed towards the middle, as if to render its attachment to the handle more secure; this specimen, like many others in the collection, has been used as an adze, rather than as a hatchet.

Many of the specimens in this Case are chisels. Nos. 23 and 24 are flint picks. No. 28 is an unusually fine polished flint hatchet from Ireland, in which country objects of this class, made of flint, are rare.

"Flint proper, or chalk-flint, as distinguished from oolitic chert, is only found in a very few localities in Ireland, chiefly in the counties of Antrim, Down, and Derry; hence we learn without surprise that the great bulk of the specimens of that material have been procured from the province of Ulster."†

A 26.

Stone Tools and Implements.

This Case contains a series of stone hammers, tools, and implements from Ireland. No. 1 is a stone for pounding corn. Nos. 3 to 18 are different varieties of hammer-stones, many of which show bruising from use. Nos. 17 and 18 were probably hafted by twisting a withe around them at the grooved part. Some country blacksmiths and platelayers on railways still haft their iron hammers in a similar manner.—See No. 34, Case C 42. Ancient examples of grooved stone axe-hammers from various parts of America are shown in Cases A 41, 42, 46, and 47, and No. 9, A 49.

The hammer-stones Nos. 4 to 11 were held between the first finger and the thumb, at the places indicated by the depressions.

* Wilson, 'Pre-Historic Man,' vol. i, pp. 153—156.

† Wilde, 'Cat. Mus. of Roy. Irish Acad.,' p. 6.

Such hammers as 6 and 8 were probably used for flaking flint, the blow being delivered from the small end of the stone, as is evident from the bruising at that part.—See No. 6. Hammers of this form are exhibited from Yorkshire, and from France. In Nos. 12 to 16 the depression for holding is deepened into a hole; such hammers, however, were probably still held in the hand, unmounted.

In some hammer-stones more than two depressions exist; thus in the Christy Collection there is a stone-pounder, or hammer-stone, from the Andaman Islands, with a series of depressions for the fingers and thumb. An ancient hatchet with similar depressions was recently found in a subterranean chamber at La Tourelle, near Quimper, in Brittany.*

Nilsson, in his work upon the 'Stone Age of Scandinavia,' gives figures of hammer-stones, which show most of the varieties of these tools.† One of these specimens (fig. 5) has six indentations upon its surface; it was found in Sweden. Fig. 4, likewise found in Sweden, has several indentations. Worsaae figures similar objects;‡ as also does Lindenschmit.§

No. 19 is a circular stone with a groove on both sides; this groove may have served for sharpening the point of a knife or dagger.‖ Similar stones were in use at a comparatively late date. One was found at Nydam in Slesvig with objects belonging to the Iron period. It is figured by Engelhardt,¶ and is classed as a whetstone.

Objects such as Nos. 32 to 42 in this Case, and Nos. 4 to 21 in Case A 27, are usually regarded as spindle whorls; probably some of them have been used to give increased momentum to spindles.** For an ancient example from Peru, attached to the wooden spindle, see No. 10, Case A 52; and for modern examples from Africa (?) attached to the spindles, see Nos. 35 to 37, Case E 4.

No. 15, Case A 27, from its oval form, could not, however, have been applied to this purpose. Many so called spindle whorls have probably been used as buttons.

* M. R. F. le Men., p. 11, 'Archæologia Cambrensis,' vol. xiv., third series.

† Plate i., figs. 1—7, 9, 11, 12, 13, and 14; pp. 10—16.

‡ 'Nordiske Oldsager,' plate xii., figs. 32—34.

§ 'Alterthümer Unserer Heidnischen Vorzeit' heft viii., taf. 1., figs. 4 and 6.

‖ Wilde, 'Cat. Mus. Roy. Irish Acad.,' p. 76.

¶ 'Denmark in the Early Iron Age,' plate xiii., fig. 65, p. 59.

** See an article on 'Ancient Spindles,' by H. Syer Cuming, 'Journ. Brit. Archæo. Association,' vol. xv, pp. 306—310.

Spindle Whorls.

The use of spindles for twisting thread has been observed in Asia, Africa, and North and South America, as well as in Europe.

With the Greeks and Romans the spindle was a stick ten or twelve inches long, having at the top a slit, or catch (*dens*, αγκιστρον), in which the thread was fixed, so that the weight of the spindle might continually carry down the thread as it was formed. Its lower extremity was inserted into a small wheel, called the whorl (*vorticellum*), made of stone, wood, or metal, the use of which was to keep the spindle more steady, and to promote its rotation.*

The ancient Mexican spindle had a whorl attached to it, to increase its momentum—the end of the spindle with the Aztecs revolved in a hole made in a piece of stone or metal. Throughout Central America, the spindle, at the present day, is made to revolve in a bowl.† The spindle in use by the Pueblo Indians of New Mexico is in the form of a boy's top, with the addition of a stem fifteen or eighteen inches long; this spindle is entirely of wood, and when used is placed in an earthen bowl, which gives a smooth surface for the lower point of the spindle to turn upon.‡ Spindles with whorls of wood or gypsum were used by the ancient Egyptians.§

Within the last few years an old lady was seen in the isle of Islay spinning flax with a spindle which was merely a stick with a potato stuck on the end of it to serve as a fly-wheel.‖ Spindles with whorls of stone are still used in parts of France and Italy.

Net-sinkers.

Many of the larger drilled stones, such as Nos. 14, 15, and 28, Case A 26, and Nos. 1, 2, and 3, Case A 27, have been called net-sinkers, and some may have been used for such a purpose. Similar objects are found in England; an example found near Grays Thurrock, Essex, is in the Museum of Practical Geology, Jermyn Street, London.¶ Stone net-sinkers have been in very

* Smith, 'Dict. Greek and Roman Antiq.,' article 'Fusus.' Herod. v. 12. Ovid. Met. vi. 22. Catullus, lxiv. 305—319.

† Schoolcraft, 'Indian Tribes,' vol. iv., p. 443.

‡ Schoolcraft, *l.c.*, vol. iv., p. 436, pl. 37, figs. 4, 5, and 6. E. G. Squier, 'Archæology of Nicaragua,' in 'Trans. American Ethno. Soc.,' vol. iii., p. 87.

§ Wilkinson's 'Manners and Customs of the Ancient Egyptians,' vol. iii., p. 136.

‖ Tylor, 'Early History of Mankind,' p. 189.

¶ Mr. Way informs me that this specimen shows admirable workmanship;

recent use in England. See the modern examples from Ambleside in Case E, Nos. 29 to 31; these, however, are grooved, and not drilled. An object resembling these is figured by Nilsson.* It is described by him as an ancient stone plummet, from Scandinavia.

The inhabitants of Heligoland and Rügen still use for net-sinkers stones having natural perforations. A drilled stone net-sinker from France is shown in Case D 15, No. 21.

Sinkers of stone were used in fishing with the hook and line at a comparatively late period in Scandinavia; thus, in an ancient Fœroe song,† it is said of one who is fishing, "He lost both hook and stone."‡

Halibut and sturgeon are taken with a hook and line by the Indians of the north-west coast of America. They use as a sinker a heavy stone enclosed in a net attached to the line§.

Fishermen on the coast of Greenland use what is known as a *pilk* of bone, provided with iron hooks, and with a stone attached to it to serve as a sinker.‖ See Case E, No. 38.

Many instances of the modern use of circular stones with drilled holes could be given which would show the necessity for caution in attempting to class *all* the ancient specimens as net-sinkers. In the Christy Collection are some perforated stone discs, 5½ inches in diameter, used for crushing or grinding grasshoppers, spiders, &c., by the Bechuanas of South Africa, who regard these insects as forming a valuable article of food. When digging wild roots, they put this stone upon the digging-stick to give it greater weight. A specimen of such a digging-stick, with the stone attached, is in the Museum of the Missionary Society, London.

Similar drilled stones are used for arming clubs by certain savages, and one, fixed to the end of a stick, from Salomon Islands, is in the Christy Museum. Mr. Robert Day, jun., of Cork, possesses another of these stone-headed clubs, from San Christoval. In the Christy Collection are some hammers with perforated stone heads, used for breaking up salt fish in Iceland.

the perforation is comparatively large and beautifully regular; it is far too highly finished for a net-sinker. It was found with a polished flint hatchet, a bronze sword and a bronze dagger blade in deepening the Mardyke, a small tributary of the Thames at Stifford, a little north of Grays.—E. T. S.

* Plate xi., fig. 216.

† 'Antiquarisk Tidskrift' for 1852, p. 312.

‡ Nilsson, 'Stone Age of Scandinavia,' p. 24.

§ Lord, 'Naturalist in Brit. Columbia,' vol. i., p. 75, p 146.

‖ Nilsson, *l.c.*, p. 25.

The use of drilled stone-discs by the North American Indians in playing a game will be noticed when the specimens Nos. 31, 32, and 33, Case A 49, are described. And lastly it may be mentioned that some savages attach a perforated stone to their fire-drill to increase its momentum.*

Methods of Drilling Stone.

In drilling holes in axes or hammers "the hole was probably produced by rotatory friction, as in rubbing or drilling with another hard round stone, and the use of sand and water."† The pre-historic tool-maker commenced boring from the two opposite faces of the implement, and if he succeeded in making the holes meet exactly opposite to each other, he would polish and work them into a fairly cylindrical opening; if he was unsuccessful the stone was thrown away, or a second hole commenced.‡ In some of the examples in Cases A 26 and 27, however, the drilling appears to have been accomplished with a metal tool.

That drilling has been effected in recent times without tools of metal is proved by the experience of travellers. Mr. Wallace speaks of cylinders of rock crystal, four to eight inches long, and one inch in diameter, which are still made and perforated by very low tribes on the Rio Negro. These are formed merely by rubbing, and the perforation is effected by twirling a flexible leaf-shoot of wild plantain between the hands against the stone, and thus with sand and water boring through the stone. This is said to take years to effect. Such cylinders as the chiefs wear are stated to take two men's lives to perforate. The stone is brought from a great distance up the river, and is very highly valued.§

Cook mentions the drilling even of glass, by the natives of New Zealand, with flakes of stone: "We had given the people at Tolaga a piece of glass, and in a short time they found means to drill a hole through it, in order to hang it round the neck, as an ornament, by a thread; and we imagine the tool must have been a piece of this jasper."‖

Professor Nilsson has pointed out that many of the perforations in stone axes have not been artificially produced. "We sometimes find, among collections of antiquities, flint axes with shaft-holes; but if we observe them more carefully we shall find

* 'League of the Iroquois,' pp. 207, 221.

† Wilde, 'Cat. Mus. Roy. Irish Acad.,' p. 78.

‡ Franks, in 'Horæ Ferales,' p. 139.

§ Wallace, p. 278.

‖ Cook's 'First Voyage,' vol. iii., chap. 10, p. 60.

that these perforations have not been made by the hand of man, but are natural holes in the flint. The savage did not drill the hole, but sometimes chipped the edge of it more or less, so as to be enabled to use it as a shaft hole. I have seen several such flint axes, both in the museum at Copenhagen and elsewhere."* A flint axe made from a fossil sponge is in the Hoare Collection at Stourhead; the haft-hole in this axe is merely a natural perforation in the fossil. It was found in Tumulus No. 158, at Normanton, Wilts, associated with bronze objects.† A flint axe, with the natural crust *inside* the hole, found in Aisne, is in the Museum at St. Germain en Laye, France.

Nilsson has suggested the form of the tool with which drilling was effected by pre-historic races:—

"Though we have only been able to guess hitherto how the savage bored the shaft-hole in his axes, yet we seem near the truth, as we are even able to call experience to our help. During a visit to Orö pilot-station, on the coast in the province of Ostro-Gotha, I saw a fisherman engaged in drilling holes in flat slate boulders, to use as plummets for his fishing-line. He worked his gimlet, or auger, with a drill-bow (*spärrborr*), the gimlet itself was of iron, not pointed, as one would suppose, but with a rough edge, and like a small chisel or screwdriver. The hole made in the stone with it was not rough at the bottom, but scooped out, just such as is found in those stone implements where the bored hole is more or less deeply indented from the surface, or like the indentations on hammer-stones, to place the fingers upon during use. I conclude from this that the savage used a similar gimlet or drill, and that his flint gimlet had the same form as that of the Orö fisherman—namely, that of a small chisel."‡

The processes adopted in drilling stone probably corresponded with some of the modes employed by savages to obtain fire. The use of the hand fire-drill by the aborigines of Australia furnishes a description of the simplest form of drill for procuring fire or for perforating stone or other substances:—

"To produce it (fire) they take two pieces of dry soft wood; one is a stick about eight or nine inches long, the other piece is flat: the stick they shape into an obtuse point at one end, and, pressing it upon the other, turn it nimbly by holding it between both their hands, as we do a chocolate mill, often

* Nilsson, 'Stone Age of Scandinavia,' p. 78.

† Hoare, 'Ancient Wiltshire,' vol. i., plate xxvii., pp. 204, 205.

‡ Nilsson, 'Stone Age of Scandinavia,' p. 79.

shifting their hands up, and then moving them down upon it, to increase the pressure as much as possible. By this method they get fire in two minutes."*

In Case C 42, Nos. 39 and 40 are two of the pieces of wood used in a similar way and for a like purpose by the Greenland Esquimaux. The resemblance of the hole in this fire-drill to the unfinished drilled hole in the stone axe No. 4, Case A 39, from Denmark, is worthy of notice.

To wind a cord or thong round the drill, so as, by pulling the two ends alternately, to make it revolve very rapidly, is a great improvement on mere hand-twirling. As Kuhn has pointed out, this contrivance was in use for boring in Europe in remote times. Odysseus describes it in telling how he and his companions put out the eye of the Cyclops :—

"They then, seizing the sharp-cut stake of the wood of the olive,
Thrust it into his eye, the while I, standing above them,
Bored it into the hole : as a shipwright boreth a timber,
Guiding the drill that his men below drive backward and forward,
Pulling the ends of the thong while the point runs round without ceasing."†

Sir E. Belcher describes a mode of drilling holes which is practised by the Esquimaux: "The thong . . . . . being passed twice round the drill (which is pointed with a piece of jade) the upper end is steadied by a mouthpiece of wood, having a piece of the same stone imbedded, with a countersunk cavity" (see tablet 6 *a*, D 5). "This held firmly between the teeth directs the tool. Any workman would be astonished at the performance of this tool on ivory; but having once tried it myself, I found the jar or vibration on the jaws, head, and brain, quite enough to prevent my repeating it."‡

Lastly, there is a kind of cord-drill used by the New Zealanders in boring holes through hard greenstone, &c., in which the spindle itself is weighted. It is described as a sharp wooden stick, ten inches long, to the centre of which two stones are attached, so as to exert pressure and act as a fly-wheel. The requisite rotatory motion is given to the stick by two strings pulled alternately.§

* Cook, 'First Voy.,' vol. iii., p. 234. Angas, S. Australia, pl. 27.

† Quoted by Tylor, 'Early History of Mankind,' p. 240. Kuhn, 'Herabkunft des Feuers,' p. 39. Hom. Od., ix., p. 382.

‡ Belcher, 'Tr. Eth. Soc.,' 1861, p. 140.

§ Thompson, 'New Zealand,' vol. i., p. 203.

A 27.

In addition to the drilled stones in this Case, which are similar to those in Case A 26, already described, some whetstones and polishing stones are exhibited. Nos. 24 and 25 are whetstones. No. 25 shows much wear. No. 33 is a whetstone now in use by jewellers; like No. 25 it is hollowed by the sharpening of tools. The whetstones exhibited probably belong to the metallic period, for similar specimens have been found at Nydam in South Jutland (Slesvig), with Roman coins belonging to the three first centuries of the Christian era.*

Sir William Wilde has observed that whetstones do not belong to the Stone age proper: "the antique specimens are usually found in connection with metal objects."†

This appears to be the case also in the New World, for in a cave near the village of San José, on the river Maypu, Chili, a copper wedge-shaped celt and two chisel-like instruments of bronze, containing from 8 to 10 per cent. of tin, were found with human remains. With these also was found a whetstone, very similar to those exhibited from Ireland; it had a small hole drilled at the end, probably to enable it to be suspended from the person.

The women in Greenland still use whetstones resembling these, and the ancient specimens found in Sweden,‡ for sharpening their bone needles.§

Nos. 22 and 23 are polishing stones. The commencement of drilling on each of the four sides of No. 23 may be noticed; probably, when completed, it would have been worn on the person, as was doubtless the case with the objects Nos. 24 and 25. A similar commencement of drilling can be seen on No. 16, Case D 17, which is the cast of a jade axe from the Dolmen of Manné-er-H'rock, Brittany; in this specimen the perforation was ultimately made more towards the end of the specimen. Wilde classes No. 23 and similar objects as touchstones‖—stones used for testing the purity of gold.

Nos. 31 and 32 are regarded as hones by some archæologists; Wilde classes them as burnishers.¶ American archæologists call

* Engelhardt, 'Denmark in the Early Iron Age,' plate xvi., fig. 19, and p. 66.

† Wilde, 'Cat. Mus. Roy. Irish Acad.,' p. 87.

‡ Nilsson, 'Stone Age of Scandinavia,' plate 2, figs. 18—20.

§ Nilsson, *l.c.*, plate ii., figs. 21, 22.

‖ Wilde, 'Cat. Mus. Roy. Irish Acad.,' p. 89.

¶ Wilde, 'Cat. Mus. Roy. Irish Acad.,' p. 89.

them gorgets. More will be said upon this subject when the large series of American "gorgets" in the collection is described.

Similar objects, differing slightly in form, have been found in several Wiltshire tumuli: one of grey slaty stone was obtained from a barrow on Mere Down;* another of chloritic slate was found in a barrow at Roundway Hill, near Devizes;† and a third at Sutton Veney, near Warminster.‡ Similar objects have been found at Sundridge, near Worcester;§ at Parks farm, in the hamlet of Aldington, Worcestershire;‖ on the farm of Fyrish Evantown, Inverness, and at Broadford Bay, in the island of Skye,¶ and elsewhere. From the nature of the material, and the position the "gorgets" occupied with reference to the skeletons, they probably were used as ornaments. The Rev. Canon Ingram, F.G.S., has suggested that they were worn as guards to the arm in shooting with the bow.** They appear to belong to the Bronze period.

Specimens of sharpening and polishing stones†† are exhibited from Denmark, in Case A 38, Nos. 22 to 27. Nos. 23 to 25 belong to the early Iron period. No. 37 is a drilled axe-hammer from Ireland.

* Hoare, 'Ancient Wiltshire,' vol. i., plate 2.

† 'Wilts Archæ. and Nat. Hist. Mag.,' vol. iii., p. 186.

‡ Hoare, 'Ancient Wiltshire,' vol. i., p. 103, plate 12.

§ 'This specimen has drilled holes at one end only, the other end is brought to an edge: its use as a flaying knife or scraper has been suggested; it probably should not be classed with the other objects described. It is now in the Museum of the Worcester Natural History Society. See 'Archæological Journal,' vol. vi., p. 409, and Allies' 'Antiq. of Worcestershire,' p. 149.

‖ 'Wilts Archæ. and Nat. Hist. Mag.' vol. x., p. 109.

¶ Both specimens are now in the Collection of the Society of Antiquaries of Scotland, Edinburgh.

** 'Wilts Archæ. and Nat. Hist. Mag.' pp. 109—113.

†† Flint is still used for polishing card or paper on the Continent. The process has only lately been discontinued in England. It was known as *leecing* or *leesing* (French *lisser*, to polish by rubbing). A large piece of smooth flint was fixed at the end of a vertical beam, which was itself hinged to the middle of a transverse beam fixed at one end to the wall by a hinge, while the other end could be depressed by means of a rope, so as to give any desired pressure upon the stone. It was the office of the workman to move the stone backwards and forwards over the surface to be polished.—(Communicated by Mr. John Evans, F.S.A., Messrs. De la Rue and Co., and Messrs. Brown and Co.) See also 'Technical Terms Relating to the Manufacture of Playing Cards,' by Mr. Danby Fry. Dr. Junghuln, of Java, has mentioned that, for many years, he used an ancient stone hatchet for smoothing the surface of his paper, whenever he had to execute minute drawings. 'Archæ. Journ.,' vol. xi., p. 122.

A 27.

Scotland.

A small series of stone objects from Scotland is shown in this Case. No. 39 is a fine drilled axe-hammer.

In Scotland these objects were popularly known as "purgatory hammers." They were frequently found associated with human remains, and the simple discoverers imagined that they had been placed with the corpse of the deceased in order that he might thunder away at the gates of purgatory until he was released.*

Nos. 40 to 45 are "spindle whorls," of which probably not one belongs to the Stone age proper; they all appear to have been drilled with a metal tool having a hollow base, which would cut out a core, and not involve the extra labour of grinding away the entire substance of the stone. Nos. 7, 11, 13, 14, 18, and 21 in this Case, from Ireland, have probably been drilled with a metal tool, as well as No. 18, Case A 30, from France; Nos. 12, 15, and others, in Case A 39, from Denmark: most of the drilling in the American series, Cases A 50 and A 51, and in the large series of stone smoking-pipes from the mounds of Ohio, Cases C 34 to C 39, was effected, probably, with tools of bronze.

Nos. 46, 47, and 48 are flint arrow-heads from Scotland.

D 15.

Wales.

No 37 is the cast of a sculptured drilled stone hammer; the original, which is unique, was presented to the Society of Antiquaries of Scotland by the Rev. E. L. Barnwell, by whom this notice has been contributed. It was found about 1840, in stubbing up a wood at Maysmote, near Corwen, Merioneth. It is of such hard chert that it is impossible to scratch the polished surface even with a steel knife. The cast is an exact facsimile in colour and appearance with the original. It could not have been an ordinary stone hammer on account of its ornamentation. It may have been the war-axe or martel of some chief; or it may have been a badge of office or of state. If used, it was, probably, used only on great occasions, as in sacrifices; but no satisfactory solution has yet been obtained.†

* Wilson, 'Pre-historic Annals of Scotland,' p. 135.

† 'Arch. Camb.,' p. 307, 1860. 'Archæ. Journal,' xix., 92.

THE STONE AND FLINT HATCHETS AND IMPLEMENTS FROM FRANCE ARE EXHIBITED IN CASES A 28 TO A 30, AND D 15 TO D 18.

A 28.

Nos. 2 and 20 are short flint hatchets, probably intended to be mounted in handles of stag's horn, or other material, in a similar way to the specimens from the Swiss lake-dwellings in Case A 31, and upon the top of Case H 8. Nos. 8 and 9 are nicely chipped flint implements; No. 9 appears to have been intended for a gouge.

A 29.

Some very fine examples of flint hatchets are shown in this Case, such as Nos. 2 to 6; No. 2 exhibits a number of planes, caused by its having been rubbed on a flat surface.

During the Stone period the use of revolving grindstones was unknown; the surface grinding as well as the grinding of the edge was effected upon flat stones, as the mason grinds his chisel now. Mr. John Monckton Brown, of Queensland, says that the stone, when of a suitable quality, by the sides of the creeks in parts of Queensland is perfectly hollowed in places where the aborigines have sharpened their stone tools. A remarkable grinding-stone popularly known as "Carreg-y-Saelhan" ("the Stone of the Arrows") existed in the middle of a path about three miles above Aber, on the northern shore of Caernarvonshire, in a pass among the mountains called "Nant-au-Afon (the Valley of the River). It is now destroyed. It was a flat block of stone about six feet in length, the upper surface of which was scored in places with short grooves about a quarter or half an inch deep. According to tradition, on the commencement of war the chieftains were accustomed to sharpen their arrows and other weapons upon this rock.* See notice of grinding-stones from Pressigny at page 106. Specimens of flat grindstones from the Swiss lake-dwellings are shown in Case D 20.

No. 14 is an unusual form of hatchet from France; it is almost Danish in type.

A 30.

The specimens in this Case are chiefly of greenstone, and are highly finished. Some of these appear to have been used,

* Hon. Wm. O. Stanley, M.P., 'Archæo. Journal,' No. 82, 1864, p. 170.

at a very recent period, for polishing substances in some branch of handicraft. In the north of Ireland weavers in modern times used ancient smooth stone celts for rubbing down threads on the cloth, bit by bit, as they worked it.* No. 5 is a most elegant form of hatchet. Nos. 20 to 27 are classed as chisels. No. 28 is a portion of a hammer-stone. No. 9 is highly polished at both ends, but the intermediate part, around which the fastening to the handle was placed, is purposely left rough. Allusion has been made at page 30 to this specimen. No. 18 is a drilled axe-hammer (probably drilled with a metal tool). No. 19 is a spear-head of flint, ten inches long, and finely chipped.

D 15.

The two lower shelves in this Case are filled with flint-flakes, implements, and stone hatchets, from France. Nos. 1 to 9, 19, and 20 are stone hatchets from Carnac, Brittany, and its neighbourhood, presented to the collection by the Rev. E. L. Barnwell. No. 12 is a flint scraper. Nos. 10, 11, and 13 are flint implements from the peat of the Somme at Abbeville. No. 21 is a net-sinker from the bed of the Seine.

Casts of Objects found in some of the Dolmens (or Cromlechs) of France are exhibited in Cases D 16 and D 17.

D 16.

Nos. 1 to 12 are casts of hatchets of fibrolite, greenstone, jade, and serpentine, found in the dolmen of Mont Saint-Michel, Carnac, Brittany; Nos. 10, 11, and 12 are drilled; the originals are in the Museum of the Société Polymathique du Morbihan, at Vannes. This dolmen was opened in 1862, by the Society named. It was situated in the centre of a long tumulus. The tumulus was 366 feet long, 174 feet broad, and 29 feet 6 inches high; the dolmen was 7 feet 6 inches long, 4 feet 6 broad, and 3 feet high.†

The objects Nos. 13 to 27 are casts of specimens from the dolmen of Bougon (Deux Sèvres); found by M. Ch. Arnaud. Nos. 13 to 18 are casts of bone tools; Nos. 19 and 20, of teeth drilled for suspension; Nos. 21 and 22, of flint hatchets—

* Wilde, 'Cat. Mus. Roy. Irish Acad.,' p. 45.

† 'Rapports de MM. R. Galles, G. Closmadeuc et Malaguti,' quoted in the Catalogue of the Museum of the 'Société Polymathique du Morbihan,' Vannes, 1867. Also 'Arch. Cambrensis,' 1864, p. 47.

No. 21 is stained green, apparently from having remained in contact with some object of copper or bronze; No. 23 is the cast of a drilled axe-hammer of greenstone; Nos. 25 to 27 are casts of flint flakes.

D 17.

Nos. 1 to 23 are casts of objects from the dolmen of Manné-er H'rock (*Montagne de la fée*), at Locmariaker (Morbihan).

This dolmen was opened, in 1863, by MM. Lefebvre and R. Galles. It was at the centre of an oval tumulus. The tumulus was 328 feet long, 197 feet broad, 33 feet high; the dolmen was 12 feet long, about 8 feet 6 inches broad, and about 5 feet high.*

The following legend is popularly regarded as explaining the origin of this dolmen and of the name it bears. A poor widow had an only son who went to sea, and did not return when expected. Day by day and year by year the mother went to the point of Kerpenhir, to look for the ship which should bring back her child. One evening, while she was sitting by her lonely hearth, an old woman approached her, and, learning the cause of her tears, advised her to build a large heap of stones, from the top of which she could obtain a more distant view, and be the better able to descry the expected vessel. All night the two women laboured, heaping up the stones which they found scattered over the surrounding soil. Daylight at length disclosed to the astonished mother the enormous pile which had been raised. The old woman assisted her to ascend to the summit, from which the mother saw the vessel containing her son nearing the shore. She turned, but the fairy had disappeared.

Nos. 1 to 16 are casts of hatchets of fibrolite, greenstone, serpentine, and jade; No. 17 is the cast of a flat ring of jade found nearly in the centre of the dolmen, upon the floor, with the point of the jade hatchet, No. 2, resting upon it. Similar stone rings have been found in the dolmens of the Channel Islands. Several specimens are in the magnificent collection of Mr. F. Corbin Lukis, F.S.A., The Grange, Guernsey, one of which shows polishing from friction in use. It was probably worn as a gorget. Nos. 18 to 23 are casts of pendants made of a material to which M. Damour has given the name of *callaïs*, but it is not now known from whence this precious stone was obtained; it somewhat resembles turquoise, but it is of an apple-green colour, and translucent.

* 'Mémoire de M. R. Galles,' quoted in the Catalogue of the Museum of the 'Société Polymathique du Morbihan,' Vannes, 1867.

No less than 91 hatchets of fibrolite obtained from this dolmen were shown at the Paris Exhibition in 1867. They were all perfect, even to the cutting edge. Most of the larger hatchets, however, were broken (it is thought purposely) in two or more pieces.—See Nos. 24 and 27, Case D 17, from Tumiac, and Nos. 5 and 11, Case D 16, from Mont Saint-Michel. Objects deposited with the dead were in some cases rendered useless to the living.

The Chinooks place their dead in a canoe, with all their weapons, implements, and ornaments. The canoe, when it has been conveyed to the burial-place of the tribe, is raised on a scaffolding of cedar poles. But the final act before leaving, is to bore holes in the bottom of the canoe, and to mutilate and render useless all the other objects left with the body.*

Nos. 24 to 32 are casts of hatchets, &c., from the dolmen of Tumiac (Arzon).

This dolmen was opened in 1853 by the Société Polymathique du Morbihan. It was found near the centre of a round tumulus. It had three roofing slabs: the one to the west was supported by three upright stones with figures carved upon them; the other two slabs rested upon a wall of rubble-stone which closed the dolmen on the eastern side. The tumulus was 60 feet high, with a diameter of 184 feet; the dolmen was 15 feet 10 inches long, 7 feet 6 inches broad, with a mean height of 5 feet 3 inches.†

D 18.

In this Case is exhibited a series of the large nucleï found near Pressigny le Grand (Indre et Loire), known from their form by the local name of *livres-de-beurre*. It is now generally held that the region around Pressigny was the site of an ancient and extensive manufactory of flint implements, which appear to have formed an object of barter or traffic, for implements made from the peculiar flint of Pressigny occur at distant places. They have been found in the dolmens of Central France; two in the Musée d'Artillerie, Paris, were obtained from the bed of the Seine; others are in the Museum of Poitiers; in the collections of the Abbés Bourgeois and Delaunay, and elsewhere.

The nucleï from Pressigny have had a number of lateral chips removed, as seen in Nos. 1 to 5. This was done in order to govern

* Wilson, 'Pre-historic Man,' vol. i., pp. 197, 198.

† 'Rapport de M. le Dr. Fouquet;' 'Mémoire de M. L. Galles,' quoted in the Catalogue of the Museum of the 'Société Polymathique du Morbihan, Vannes,' 1867.

the form of the long flakes, to be subsequently struck off, and which were intended for daggers, lance-heads, &c.*

An attempt has been made to show that these large cores at Pressigny are the waste of a manufactory of gun-flints. The miquelet gun-lock was first introduced in 1630, but it is doubtful whether flint or iron pyrites was used; if flint, it was used without having been subjected to any manufacturing process. In 1703, however, a complete change had taken place in firearms. The soldier was armed with a musket, but it was his duty to find his own flints; and it was not until 1719 that gun-flints were regularly manufactured in France. Extreme care has always been taken in that country to select only localities where the flint is well adapted for the purpose, and lists of these selected localities are preserved in the Archives of the Depôt Central de l'Artillerie. Pressigny is not named among them; the Pressigny flint is not adapted for making gun-flints, and none of the small waste chips, so abundant upon the site of a gun-flint manufactory, are found at Pressigny.

The Marquis de Vibraye sent a series of flint hatchets found at Pressigny to the Paris Exhibition (1867). These specimens illustrate the progress of manufacture from the rude block to the finished implement; all presented some defect, showing that they were neither serviceable implements accidentally lost, nor tools which had been thrown away after having been broken in use, but specimens which had been rejected in the process of manufacture. M. Gabriel de Mortillet has well observed that the supporters of the gun-flint theory, if any remained, would do well to shut their eyes in passing this Case.†

A fine grindstone, with four grooves worked in it from use, found at Pressigny, was sent to the Paris Exhibition from the museum at Tours; and another from Pressigny about 2 feet square, showing six grooves from use, was exhibited by M. Samarson. It is probable that the rubbed flint hatchets found near Pressigny do not belong to the same period as the *livres-de-beurre*.

M. Salmon sent a series of specimens to the Paris Exhibition showing every stage in the manufacture of flint hatchets: first, the implement merely roughly shaped out by flaking; then partially polished; then completely polished, and with the cutting edge ground; then with the edge broken; and, lastly, with the edge

* Evans on the 'Worked Flints of Pressigny le Grand,' Archæologia, 1867. Steenstrup and Lubbock, 'Trans. Ethno. Soc.,' new series, vol. v., pp. 221—227.

† 'Promenades Préhistoriques à l'Exposition Universelle,' p. 34.

re-ground and ready for use again. A somewhat similar series was sent from the museum of Poitiers.*

D 15.

As a temporary arrangement, the upper part of Case D 15 has been filled with specimens from widely-scattered localities, and from which but few examples exist in the collection.

AFRICA.

Upon tablets 22 to 27, and 34 to 36, are shown some human-worked flakes of quartzite from the neighbourhood of the Cape of Good Hope.

We are so much in the habit of ignoring the existence of a Stone age in Africa, that the following quotations† bearing on the subject may be interesting :—

"On the West African coast, north of the Cape, there were pastoral tribes, probably Hottentots, who evidently did not know then, as they do now, how to work the abundant iron-ore of their country. At Saldanha Bay, in 1598, John Davis could get fat-tailed sheep and bullocks for bits of old iron and nails; and in 1604 a great bullock was still to be bought for a piece of an old iron hoop. But only seven years later, Nicholas Downton, 'Captaine of the Pepper-Corne,' begins to write ruefully of the change in this delightful state of things; 'Saldanha having in former time been comfortable to all our nation travelling this way, both outwards and homewards, yeelding them abundance of flesh, as sheepe and beeves brought downe by the saluage inhabitants, and sold for trifles, as a beife for a piece of an iron hoope of fourteene inches long, and a sheepe for a lesser piece;' but now this is at an end, spoilt perhaps by the Dutchmen, 'who use to spoyle all places where they come (onely respecting their owne present occasions) by their ouer much liberalitie.'"‡

In Western Africa, when the god Gimawong came down to his temple at Labode on the Gold Coast once a year, with a sound like a flight of wild geese in spring, his worshippers sacrificed an ox to him, killing it, not with a knife, but with a sharp stone.§

It appears from Herodotus that the African Ethiopians in

* 'Promenades,' *l.c.*, pp. 46, 47.

† Taken from Tylor's 'Early History of Mankind,' pp. 219, 222.

‡ Purchas, vol. i., pp. 118, 133, 275, 417.

§ Römer, p. 54; Klemm, C. G., vol. iii., p. 378; Bosman, 'Beschryving van de Guinese Goud-Kust.,' &c., Utrecht, 1704, p. 109.

the army of Xerxes, not only headed their arrows with a sharp stone, of a variety which they also used for engraving seals, but had spears armed with sharpened horns of antelopes, while the Libyans had wooden javelins hardened at the point with fire.*

Strabo mentions that in Ethiopia a tribe lived who pointed their reed-arrows in this way, and another who used as weapons the horns of antelopes.†

It is interesting to observe that in South Africa the spear headed with a horn has been in use up to our own time: Mr. Anderson saw the natives at Walfisch Bay spearing the fish left at low water with a gemsbock's horn attached to a slender stick.‡

Upon tablet 38 are casts of two stone hatchets from Djelfa, Algeria.

Flint and stone implements, and arrow-heads, have been found in various parts of North Africa, at Constantine, at Dellys, on the coast, and in the desert south-east of Oran, on the confines of Morocco. At Bou-Merzoug, on the plateau of the Atlas, south of Constantine, the late Mr. Henry Christy found flint-flakes and arrow-heads, close to a group of dolmens. The legend accounting for the presence of these stones is that a wicked people once dwelt there, and for their sins stones were rained upon them from heaven; so they built these dolmens of huge slabs of stone to creep into.§

East Indies.

Stone implements have been found in Central India,‖ Madras, Bengal,¶ Bombay,** Scinde, Assam, Burmah,†† and the Andamans.‡‡

Upon tablets 28 to 30 are cores and flakes of agate, jasper, &c., from Jubbulpore, Central India, presented by Sir Charles Lyell,

* Herod., vii., § 69, 71.

† Strabo, xvi., 4, 9, 11.

‡ Anderson, p. 15.

§ Tylor's 'Early History of Mankind,' p. 221.

‖ H. P. Le Mesurier, C.E., 'Proceedings Asiatic Soc. Bengal,' 1861, p. 81. H. R. Carnac, in 'P.A.S.B.,' 1865, p. 77. W. H. Blanford, in 'P.A.S.B.,' 1866, p. 230; 'P.A.S.B.,' Sept. 1867. W. Theobald, jun., 'P.A.S.B.,' 1862, p. 323. V. J. Carey, 'P.A.S.B.,' 1866, p. 135.

¶ V. Ball, 'P.A.S.B.,' 1865, p. 127; 'P.A.S.B.,' Sept. 1867. W. Theobald, 'P.A.S.B.,' 1862, p. 323; and 1865, p. 127.

** A. B. Wynne, 'Geolog. Mag.,' June 1866, p. 283, and Feb. 1866, p. 95; 'P.A.S.B.,' 1865, p. 207.

†† W. Theobald, jun., 'P.A.S.B.,' 1865, p. 126.

‡‡ W. Theobald, jun., 'P.A.S.B.,' 1862, p. 326. 'P.A.S.B.,' 1863, p. 306.

Bart. These specimens with many others were found by the late Lieut. Swiney. The materials used have been obtained from the local trap formation; the cores and flakes occur in abundance along the edge of the trap country; they are chiefly met with on gentle rises, but rarely found scattered over alluvial plains.*

Upon tablet 31 are two cores from the Indus valley, Scinde. These are said to have been found four feet beneath the surface of the bed of the river Indus, in a deposit of gravel about two feet thick; the material probably partakes of the nature of a quartzite rather than that of a true flint.† They were presented to the collection by the Bedfordshire Archæological Society, to whom several specimens had been given by Captain John Le Mesurier, the finder of them.

Sir John Lubbock‡ mentions that a belief in the thunderbolt origin of stone hatchets prevails in Upper Assam among the natives; and that there, as elsewhere, they are regarded as possessing potent talismanic properties.

Arabia.

Upon tablet 39 are flakes found at the ancient turquoise mines in the Wady Magarah, Mount Sinai, which were worked by the Egyptians as early as the 5th dynasty.

Egypt.

Upon tablet 32 is a stone hatchet of peculiar form, said to be of ancient Egyptian manufacture.

Upon tablet 33 is the cast in sulphur of a small celt of dark green nephrite, or jade, 2 inches long, $1\frac{1}{2}$ inches broad, brought from Egypt by Colonel Milner in 1812. Each of its faces is engraved with a Gnostic formula in the debased Greek character current at Alexandria during the third and fourth centuries. One of these formulæ is in the fashion of a wreath composed of fourteen leaves, each of them engraved with Gnostic charms. This object is supposed to have been originally a *ceraunia* (thunderbolt stone), mentioned by Pliny as resembling an axe-head, and as possessing sacred and talismanic properties, which are detailed on the authority of Sotacus, one of the most ancient

* 'Proceedings Asiatic Society of Bengal,' W. H. Blanford, 1867, pp. 142, 143; H. R. Carnac, 1865, p. 77; W. H. Blanford, 1866, p. 230. Evans, 'Proc. Soc. Antiq.,' second series, iii. 39.

† Evans, 'Geological Mag.,' October, 1866, pp. 433, 434; Gen. Twemlow, 'Geological Mag.,' January, 1867, pp. 43, 44.

‡ 'Athenæum,' June 22, 1867.

writers on mineralogy. This ancient talisman the Gnostics, probably at Alexandria, appear to have sought to endue with fresh mysterious powers by the formulæ engraved upon it.* The cast of this interesting object has been added to the collection by Mr. Albert Way, F.S.A., who has also furnished the above notice of it. The original has been presented to the Christy Collection by Mrs. Milner.

No specimen of flint knives from Egypt occurs in the collection. In the Christy Collection is the cast of an ancient flint knife from that country, the original of which is in the Berlin Museum. The delicacy of the chipping upon this object is very remarkable.† An Egyptian flint dagger, in its original wooden handle, has been recently added to the British Museum.

Use of Stone Knives for Religious Ceremonies.

It is well known that knives of stone were used for some ceremonial purposes by the ancient Egyptians and the Jews.

The passage in Herodotus (ii. § 86), which relates that mummy embalmers in Egypt made the incision in the side of the corpse with a sharp Æthiopic stone, has been frequently cited. The account given by Diodorus Siculus is fuller. "And first, the body being laid on the ground, he who is called the scribe marks on its left side how far the incision is to be made. Then the so-called slitter (*paraschistes*), having an Æthiopic stone, and cutting the flesh as far as the law allows, instantly runs off, the bystanders pursuing him and pelting him with stones, cursing him, and, as it were, turning the horror of the deed upon him."‡

The use of stone knives by the Jews in the rite of circumcision has been often quoted. Exodus iv. 25: "And Zipporah took a stone." Joshua v. 2: "At that time Jehovah said to Joshua, Make thee knives of stone." In the Septuagint translation, these knives are said to have been placed in Joshua's tomb, where they remain until this day (Joshua xxiv. 30). This, as Gesenius says, is a circumstance worthy of remark, and goes to show, at least, that knives of stone might have been found in the sepulchres of Palestine as well as in those of north-western Europe.§

* See Mr. King's Memoir on this relic, 'Archæological Journal,' vol. xxv.

† Ancient Egyptian flint knives in the Berlin Museum are figured in 'Wilkinson's Ancient Egyptians,' vol. iii., p. 262.

‡ Diod. Sic., ii., p. 62.

§ Evans, 'Man and his Earliest Known Works.'

The Rabbinical law permits the use of stone knives for circumcision. "We may circumcise with anything, even with a flint, with crystal, or with anything that cuts, except with the sharp edge of a reed, because enchanters make use of that." It is curious to find that circumcision was regularly performed with a sharp splinter of bamboo among the Fiji Islanders.* Leutholf states that a stone circumcising knife was in use in his time (sixteenth century) in Æthiopia. "The Alnajah, an Æthiopian race, perform circumcision with stone knives."† Among the modern Jews a steel circumcising knife is used, with this remarkable exception: If a male child dies before the eighth day, it is circumcised before burial, not with the ordinary instrument, but with a piece of flint or glass.

Mr. Tylor refers such practices to superstition; to the "standing over" of old habits into the midst of a new and changed state of things; to the retention of ancient practices for ceremonial purposes, long after they had been superseded by more recent inventions for all ordinary purposes.‡ He also notices the extreme importance which was attached to the use of the sacred flint by the Romans. It was kept in the temple of Jupiter Feretrius, and was brought out to be sworn by, and with it the pater patratus smote the victim, slain to consecrate the solemn treaties of the Roman people. "If by public counsel," he said, "or by wicked fraud, they swerve first; in that day, O Jove, smite thou the Roman people, as I here to-day shall smite this hog; and smite them so much more as thou art abler and stronger." And having said this, he struck the hog with a flint-stone.§

The Arabians used stone knives in the ceremonial of making pledges of faith: "Some one connected with both parties stands betwixt them, and with a sharp stone opens a vein of the hand, near the middle finger of those who are about to contract."‖

The continued use by any particular people of flint or stone, for some purposes, long after metal has been in common use by them for others, does not in every case, however, point to a superstitious reverence for ancient customs. It may merely arise from convenience, or in some instances from necessity, as

* Mariner, vol. i., p. 329; vol. ii., p. 252. Williams, 'Fiji,' vol. i., p. 166.

† Ludolfi, 'Historia Æthiopica,' Frankfort-on-Maine, 1581, iii., pp. 1—21.

‡ Tylor, 'Early History of Mankind,' p. 218.

§ Liv. i., 24; xxx., 43. Grimm, D.M., p. 1171.

‖ Herodotus, iii. § 8. For the use of stone knives see also Ovid: Fasti iv. 237. Catullus, lxiii. 5.

in the case of the Huguenots, cited at page 36. The ancient Egyptians, in the height of their civilization, used stone arrow-heads in hunting; two specimens of these are shown in the Christy Collection. An ancient Egyptian bow of curious structure, and four reed arrows tipped with flint are in the Abbott Collection of Egyptian Antiquities, now in the Museum of the New York Historical Society. These interesting objects are from Sakkarah.* The discovery of stone arrow-heads upon the battle-field of Marathon has been often cited, but they may have been shot by the barbarian troops.

Within the last century, the Tunguz of north-eastern Siberia were using stone arrow-heads,† although they are expert iron workers.

The General Distribution of Stone Implements.

Stone hatchets and implements have been found nearly all over the world; in most districts of Europe, Asia Minor, Assyria, India, China, Japan, Java, North and South America, the West Indies, New Caledonia, New Zealand, Australia, &c.‡ This was quite borne out by the collection brought together at the Paris Exhibition (1867). Objects belonging both to the palæolithic and the neolithic periods were exhibited from Spain.§ Specimens belonging to the palæolithic and the neolithic periods were shown from Würtemburg.‖ Stone hatchets of the neolithic period were exhibited from the Government of Minsk, Western Russia; and casts of others, from Northern Russia, were shown by M. Osierski. Some of these last were casts of drilled stone axes with a point at one end and an animal's head at the other; some specimens were seven or eight inches long;—one about four inches long was coloured to represent a grey flint; this specimen was drilled: all the forms were very singular. This interesting set of casts is at present in the Christy Collection, London. Bronze axe-hammers of somewhat similar forms are found in Hungary.

Many of the Russian specimens, and in particular a very fine drilled stone axe found in the province of Minsk which was exhibited, must be attributed to a late period, from the very elaborate way in which the details were carried out.

* 'Cat. Mus. New York Historical Soc.,' No. 415, p. 31.

† Ravenstein, p. 4.

‡ Franks in 'Horæ Ferales,' p. 134.

§ Mortillet, 'Promenades,' *l.c.*, pp. 103—105.

‖ Mortillet, 'Promenades,' *l.c.*, p. 74.

Some flint arrow-heads were exhibited, intermediate in form between the Scandinavian and the North American types; they were found in Olonetz. Two grooved stone axe-hammers from the Caucasus were shown; they resembled those found in Spain and North America, but instead of coming from the copper mines, these were obtained from the salt works of Erivan. A drilled stone axe from another part of the Caucasus was exhibited.*

A flint was exhibited as a drift implement from Hungary, but in reality it was only naturally-fractured, and showed no evidence of human workmanship. Six stone hatchets and other objects of the neolithic period, from Hungary, were exhibited.† Some of these are in the Christy Collection and others are in the Museum at St. Germain.

A small hatchet of hæmatite or touchstone found at Sardis, in Lydia, in 1811, is now in the British Museum.‡ M. Girard de Rialle mentions the discovery of a polished stone hatchet near Smyrna.§

Rubbed stone hatchets similar to those of Europe are found in Greece. MM. Lenormant and Dumont have given a list of localities and a description of some of these objects in two articles published in the 'Revue Archéologique,'‖ from which the following account is derived.

Attica.—An admirably chipped flint spear-head was found at the village of Dervisch-Aou. Dr. Finlay possesses a fine stone hammer found close to Athens. Between Kératia and Léopézi there is a little hillock, the surface of which is completely strewed with flint knives, triangular flint spear-heads, flint scrapers, and implements. They occur in such numbers that it is probable a manufactory of them existed upon the spot.

Bœotia.—In 1860, M. Lenormant found upon the summit of a hill near Orchomenus a large number of flint hatchets, chiefly unfinished or rejected implements, indicating the site of a manufactory. M. Lenormant has presented a specimen to the Museum at St. Germain, as well as a portion of a polished basalt hatchet found at Livadia (the ancient Lebadia).

* Mortillet, 'Promenades,' *l.c.*, pp. 127, 129.

† Mortillet, *l.c.*, p. 75.

‡ 'Horæ Ferales,' p. 136, plate 11, fig. 13. 'Archæological Journal,' vol. xv., p. 178.

§ Letter dated from Paris 5th December, 1867, 'Matériaux,' vol. iii., p. 468.

‖ 'L'Age de la Pierre en Grèce,' January 1867, pp. 16—19; 'Renseignements nouveaux sur la Grèce avant la legende et avant l'histoire,' August 1867, pp. 141—147, plate xvi.

Megaris.—M. Lenormant has found on the plains of Megara, near Rhus, a rude flint knife.

Corinth.—A peasant of Corinth gave M. Lenormant a finely chipped spear-head of obsidian, found in the neighbourhood.

Arcadia.—A surgeon of Argos showed M. Lenormant an almond-shaped chipped flint hatchet of drift type. He stated that it was found, with several others like it, at Megalopolis, in the quaternary drift, associated with bones of the great extinct pachydernis.

Laconia.—In 1863, M. Lenormant found part of a polished stone hatchet, of the ordinary European type, near the site of Gythium (modern Marathonisi).

Achaia.—Dr. Anninos, of Patras, possesses two flint knives and a rude triangular flint spear-head found near that place. At Vostitsa (the ancient Ægium), M. Lenormant obtained from a countryman a small rubbed hatchet made of white quartz, remarkable for its slenderness and shortness.

Eubœa.—In the geological collection of the University of Athens there are two very fine polished stone hatchets, found near Carystos.

Cyclades.—M. Lenormant bought of a peasant of the island of Nio (the ancient Ios), an obsidian core, from which flakes had been removed. In the collection of Dr. Finlay, at Athens, there are some arrow and spear-heads of obsidian, found in the islands of Anaphé and Amorgos.*

M. Dumont mentions a serpentine hatchet which is at Athens, bearing on one side an inscription in Greek characters and three human figures. The carving was doubtless added at some late period with the view of imparting a further talismanic value to the specimen.†

At the extremity of the plain of Marathon, near the sea-shore, is the tumulus mentioned by Pausanias, beneath which the Athenian citizens slain in the battle were buried. Very many arrow-heads are found here; most of them are of bronze, very short, barbed, trilateral in form, and socketed. Others, however, are of black flint; longer ‡ than those of bronze, and all of the triangular type. The black flint of which they are made

* 'Matériaux,' *l.c.*, vol. iii., pp. 124, 125.

† 'Matériaux,' *l.c.*, vol. iv., p. 9. See the notice of a cast of a similar specimen from Egypt in the collection, pp. 109, 110.

‡ 3 to 4 centimetres long.

is very rare in Greece; it is thought that these weapons belonged to Persian archers.*

A flint hatchet of drift type, and a stone hammer with depressions for the finger and thumb, have been found near Bethlehem by the Abbé Morétain.† It is interesting to learn that the caves in Syria are still used by the shepherds as shelters for themselves and their flocks in bad weather.‡

M. L. Lartet and M. le Duc de Luynes found flint flakes and scrapers, in 1864, in the caves of Nahr-el-Kelb (Lycus). On the coast of Phœnicia, between Tyre and Sidon, they found flint flakes in a cave, § and near the east side of the Dead Sea they obtained others. ‖ M. Cazalis de Fondouce has found flint flakes near the source of Aïn-el-Emir, a little to the south of Nazareth. A flat pear-shaped implement, of pinkish chert, blunt at the point, but in other respects of drift type, has been obtained from the mounds of an ancient city at Abu Shahrein, in Southern Babylonia; it is now in the British Museum.¶ A small polished hatchet of basalt found at Muquier, Southern Babylonia, is in the same collection;** some flakes of obsidian found at Babylon are in the Louvre. M. Adrien de Longpérier has stated that in 1852 M. Victor Place found flint flakes, with objects of carved and polished stone, under the great stone bulls at the palace of Khorsabad, which was built in the eighth century before our era, and M. Worsaae has mentioned that in the Sahara, near the frontiers of Egypt, travellers find, under the sand, hatchets of flint resembling those of Europe.††

A stone adze from China is exhibited in the Christy Collection, London.

M. Stanislas Julien has extracted passages from different

* François Lenormant, 'Les armes de pierre de Marathon,' published in the 'Revue Archéologique,' February, 1867, pp. 145—148; 'Matériaux,' *l.c.*, iii., p. 132.

† 'Matériaux,' *l.c.*, vol. ii., pp. 406, 407.

‡ M. de Vogüé, 'Proceedings International Congress of Pre-historic Archæology,' Paris, 1868, pp. 113—115.

§ Louis Lartet, 'Note sur la découverte de silex taillés en Syrie,' Paris, extracted from the 'Bull. Soc. Géologique,' 2nd series, xxii., pp. 537—545.; 'Matériaux,' *l.c.*, vol. ii., pp. 406, 407.

‖ 'Matériaux,' *l.c.*, vol. i, p. 192.

¶ Franks in 'Horæ Ferales,' p. 132, plate 1, fig. 19. Proceedings of Society of Antiquaries, 2nd series, vol. 1, p. 65.

** 'Horæ Ferales,' p. 136, plate 11, fig. 14.

†† 'Proceedings of the International Congress of Pre-historic Archæology,' Paris, 1868, pp. 115—119.

Chinese works which prove the existence of a Stone age in China. Not only are arrow-heads and hatchets of stone noticed, but also agricultural implements made of the same material.*

Grosier, referring to Nan-hiu-fu, in the province of Kwan-tong, in Southern China, states, "They find in the mountains, and among the rocks which surround it (the province), a heavy stone, so hard that hatchets and other cutting instruments are made from it."† There is a Chinese tradition of the sequence of the ages. It is to this effect. Fu-hi made weapons; they were of wood; those of Shin-nung were of stone; and Chi-yu made metal ones.‡

A belief in the supernatural origin of stone hatchets is as common in China as it is in other parts of the world.§

A passage in a Chinese work, cited by M. Stanislas Julien, proves the use of stone arrow-heads by tribes on the confines of China, in B.C. 1050, when arrows with stone points were sent as a tribute to the Emperor Won Wang. They were, however, considered by the Chinese sufficiently remarkable to be especially noticed, and it may therefore be concluded that stone arrow-heads were no longer in use in China proper at that early date.

Mr. Franks read a paper at Norwich, in August last (1868), on "Stone Implements from Japan." He stated that flint and stone implements were discovered in various parts of Japan, chiefly in the northern part of the great island of Niphon. They are greatly sought after by the Japanese, who value them highly, and look upon them as relics of their mythical period, that of the Kamis, or spirits. Attention was first called to these objects by Von Siebold, who has published engravings from originals obtained by him in Japan, or from illustrations to a Japanese work on mineralogy. Mr. Franks exhibited these engravings, and twenty original specimens which he had himself selected from a Japanese collection of minerals. The arrow-heads are chiefly barbed, although some are of the triangular type. One stemmed obsidian arrow-head was of unusual shape, having peculiarities of form difficult to explain without an illustration. The spear-heads are of a spindle form; the stone knives are broad at the

* Chevreul, 'Note historique sur l'age de pierre à la Chine' in 'Comptes Rendus,' 13th August, 1866, vol. lxiii., pp. 281—285; 'Matériaux,' *l.c*, vol. ii., p. 534.

† Grosier, 'De la Chine,' Paris, 1818, vol. i., p. 191.

‡ Goguet, vol. iii., p. 331.

§ 'Mémoires concernant l'Histoire, &c., des Chinois, par les Missionnaires de Pékin,' Paris, 1776, vol. iv., p. 474. Klemm, C.G., vol. vi., p. 467.

back, sharpened at the edge, rounded off at one end, and with a tang worked out at the other; indeed they were probably intended to be attached to some kind of handle as our ordinary dinner-knives are, and not to have the back inserted in wood, as is the case with the flint knives found in the Swiss lake-villages. The Japanese knives range from 2 to 3¼ inches long. The stone hatchets are similar in form to those of Europe; they are small, being from 2 to 4 inches in length. Some have flat sides like those from Denmark, others have an oval section. The spear-heads are from 3 to 4½ inches long, the arrow-heads from 1 to 2½ inches long. The arrow-heads are made of flint, jasper, and obsidian; the hatchets of basalt and jadeite.

Mr. Franks mentioned that in some of the countries near Japan stone weapons were used down to a comparatively late date, as is shown by a passage in a Japanese chronicle, the *Niphonki*, written in A.D. 720, which mentions that the Prince of Sinra brought as tribute to the Mikado, in B.C. 27, spears with stone points.

In the Museum at Leyden about one hundred ancient stone implements from Java are exhibited; they are made of basalt, quartz, hornstone, flint, jasper, and agate. Stone implements appear to occur most abundantly in the western parts of Java; those in the Leyden Museum are from the residency of Buitenzorg and the estate of Preanger. Some of the Javanese stone-hatchets present a general resemblance to the ordinary European types; others, however, differ wholly from any which have hitherto been met with elsewhere. One class of these has a peculiar trilateral section, and another class, when seen in section, is very convex upon the upper and very concave upon the under side of the blade. The last, *in outline*, are not very unlike some of the jade adze-blades of the New Zealanders, from which they differ in being more elegant in form.* M. Kunder von Camavecq possesses a number of specimens found by him in different parts of Java, but chiefly in the province of Bagelen.†

An important collection of ancient stone implements and weapons found at Java has been given to the French Government by M. Van de Poel, of Cheribon. This series, consisting of 39 objects, has been presented to the 'Académie des

* 'Archæo. Journal,' vol. xi., pp. 116—123. 'On Stone Wedges of Java,' translated from a Memoir by Dr. Conrad Leemans, by James Yates, F.R.S.

† 'Proceedings Asiatic Soc., Bengal,' Sept. 1867, p. 153. Lieut.-Col. H. Yule, B.E. 'Journ. Asiatic Soc. Bengal,' 1862, p. 30.

Sciences' of Paris by the Minister of Public Instruction. The specimens were obtained with difficulty, as the natives regarded them with religious veneration.* They differ from any already in the possession of the Academy, and are remarkable for the symmetry of their forms. They vary in length from 385 millimetres to 26 millimetres; these being the two extreme measurements. They are of flint, chalcedony, jasper, porphyry, aphanite, sandstone, &c.

In shaping these implements the rough block of stone was weakened along the intended line of fracture by being sawed partly through on both sides; the ultimate severance was effected by a blow. This mode of working bone and stone appears to have been constantly adopted in prehistoric times, and by modern savages possessing but indifferent cutting tools. From the convexity of the groove upon some of these Javanese implements, it is probable that a cord with sand was used for sawing. Oviedo, who visited St. Domingo in 1513, says that the inhabitants and their neighbours on the adjoining continent were able to cut iron, using only sand and a thread of *Cabuia* or *Henequen* (two species of agave) for the purpose. They made use of the thread, as we should of a saw, drawing it alternately from right to left, at the same time rubbing quickly against the iron very fine sand, which they had previously spread along the passage.†

* 'Matériaux pour l'Histoire de l'Homme,' vol. ii., p. 212.

† 'Rapport sur une collection d'instruments en pierre découverts dans l'Ile de Java' (Commissaires: MM. Daubrée, Roulin, rapporteur), 'Comptes Rendus' de l'Acad. des Sciences, Paris, 28th December, 1868; 'Geological Magazine,' March 1, 1869, vol. vi., No. 3.

THE ANCIENT LAKE-DWELLINGS OF SWITZERLAND.

The collection of objects exhibited from the lake-villages (*pfahlbauten*) of Switzerland is large and interesting. It was formed by Admiral the Honourable E. A. J. Harris, C.B.—then H. M. Minister at Berne, who obtained in so doing the valuable assistance of Dr. Keller, Dr. Uhlmann, the late M. Troyon, and other eminent Swiss archæologists. Professor Rütimeyer has also enriched the collection by adding a fine series of animal remains illustrative of the fauna of the pfahlbauten; unfortunately these specimens cannot be exhibited from want of space.

So many circumstances combine to render the objects recovered from the pfahlbauten of special interest in a collection illustrative of the Stone period that it has been thought desirable to give a summary of the information which has been published upon the subject.

Those who seek further information should read "The Lake-Dwellings of Switzerland," by Dr. Keller, translated by Mr. John Edward Lee, F.S.A., and the excellent article in "Prehistoric Times," by Sir John Lubbock, Bart., F.R.S.,* from which two books the following account is chiefly derived :—†

Original Discovery of the Lake-Dwellings.

So early as the year 1829, piles and other antiquities were discovered in deepening the harbour in front of Ober Meilen, on the Lake of Zurich; but the matter was not then followed up.

* Pp. 119—170.

† See also Troyon, 'Habitations Lacustres,' and Desor 'Les Palafittes.' The lake-dwellings of Savoy have been described by M. Laurent Rabut, 'Habitations Lacustres de la Savoie,' Chambéry, 1864, extracted from 'Mém. et Documents,' published by the 'Soc. Savoisienne d'Hist. et d'Archéol.,' vol. viii.

The earth dug out, and all contained in it, was taken in boats and sunk in the deeper parts of the lake.

The dry winter of 1853-54 reduced the level of the lakes lower than had ever been previously known. The water-mark of 1674 upon the stone of Stäfa was the lowest recorded, but in 1853-54 the water-level was one foot below this mark: consequently, in some places a broad strand was left uncovered along the margin of the lakes, and shallows in them were converted into islands. Taking advantage of this circumstance, the inhabitants of Ober Meilen reclaimed a piece of land, which they enclosed with walls, and raised the level of the included space with mud dredged from the lake. In dredging this mud numbers of piles, stags' horns, implements, and other objects were found. A reference to Plan 1, in Case K, 4, will show the places at which these excavations were made. M. Aeppli of Meilen was the first person to draw attention to these objects. Subsequently Dr. Keller conducted further researches at Meilen which he followed up by similar investigations in other lakes.* The result has established the fact that the early inhabitants of Switzerland constructed some, at least, of their dwellings above the surface of the water, in which they probably lived in a similar manner to those Pæonians whose habits have been described by Herodotus.†

Ancient and Modern Notices of Pile-Dwellings.

Some of the Pæonians, a Thracian tribe, lived in huts supported upon piles driven into the bed of the lake Prasias in Pæonia (part of modern Roumelia). The following passage from Herodotus describes these dwellings and the habits of the people:—

"They, on the other hand, who dwelt about Mount Pangæus and in the country of the Doberes, the Agrianians, and the Odomantians, and they likewise who inhabited lake Prasias, were not conquered by Megabazus.‡ He sought indeed to subdue the dwellers upon the lake, but could not effect his purpose. Their manner of living is the following: platforms supported upon tall piles stand in the middle of the lake, which are approached from the land by a single narrow bridge. At the first the piles which bear up the platforms were fixed in their places by the whole body of the citizens; but since that time the custom

* Keller, *l.c.*, pp. 10, 11; 'Prehistoric Times,' p. 119.

† B. v. § 16. Herodotus was born about 404 B.C.

‡ The date of the expedition of Megabazus is B.C. 513.

which has prevailed about fixing them is this: they are brought from a hill called Orbelus, and every man drives in three for each wife that he marries. Now the men have all many wives apiece, and this is the way in which they live. Each has his own hut, wherein he dwells upon one of the platforms; and each has also a trap-door, giving access to the lake beneath; and their wont is to tie their baby children by the foot with a string to save them from rolling into the water. They feed their horses and their other beasts upon fish, which abound in the lake to such a degree that a man has only to open his trap-door and to let down a basket by a rope into the water, and then to wait a very short time, when up he draws it quite full of them."

But for the recent death of M. Morlot we might perhaps at this moment have been testing the truth of the account given by Herodotus of the Pæonian lake-dwellers by commenting on actual specimens of their huts, their weapons, and their fishing implements. With the aid of Sir John Lubbock, and others interested in such inquiries, M. Morlot was in the midst of arranging an expedition into Roumelia to dredge in Lake Prasias, when he died. It is to be hoped that some properly qualified traveller may yet be found to carry out an undertaking so unhappily interrupted.*

A letter announcing the discovery of sculptured representations of pile-dwellings upon Trajan's column has been published.† M. Frochner says that one of these is intended to represent a hut made of planks, with a sloping roof, supported by piles driven into the bed of a river, the entrance to which is by a kind of trap-door. There is also a circular enclosure supported by piles, thought by M. Frochner to have been intended for flocks.‡ That these structures are supported upon piles is apparent to any one who sees an engraving of this sculpture,§ but they probably do not bear much resemblance to the ancient lake-villages of Switzerland.

Dr. Keller's attention was called by Professor Hitzig to a passage in the "Supplementa tabulæ Syriæ," cap. ii., ‖ of which the following is a translation:—

"The Apamæan lake consists of an innumerable number of smaller lakes and reedy places. Two of them, however, are

* 'Quarterly Review,' No. 250. October, 1868. p. 420.

† 'L'Union Libérale,' Neuchâtel, 14th March, 1867.

‡ 'Matériaux,' *l.c.*, vol. iii., pp. 176, 177.

§ Pietro Santi Bartoli, 'Colonna Trajana,' plate 19, fig. 137.

‖ Written by Abulfeda, a geographer and a Syrian prince who died A.D. 1332.

larger than the others, one to the south and the other to the north. . . . . Between this southern lake and the northern one, there is a wood of reeds, through which there is a narrow channel, by which vessels pass from the southern to the northern lake. This latter lake is reckoned amongst the land of Hesu Borzajjah, and it is commonly called the lake of the Christians, *because it is inhabited by Christian fishermen, who live here on the lake in wooden huts built upon piles.*" *

The "crannoges" found in Ireland and Scotland will be described at page 130, when particulars of the structure of lake-dwellings are given. These "crannoges" are frequently mentioned in early history. According to Shirley,† "One Thomas Phettiplace, in his answer to an inquiry from the Government as to what castles or forts O'Neil hath, and of what strength they be, states (May 15, 1567): 'For castles, I think it be not unknown unto your honors, he trusteth no point thereunto for his safety, as appeareth by the raising (*sic*) of the strongest castles of all his countreys, and that fortification which he only dependeth upon is *in sartin ffreshwater loghes* in his country, which from the sea there come neither ship nor boat to approach them: it is thought that there in the said fortified islands lyeth all his plate. . . . . which islands hath in wars to fore been attempted and now of late again by the Lord Deputy there, Sir Harry Sydney, which for want of means for safe conducts upon the water it hath not prevailed.' ‡

Many savage and semi-savage tribes live in pile-dwellings at the present day. The fishermen of Lake Prasias still inhabit wooden cottages built over the water as in the time of Herodotus. The city of Tcherkask is built over the Don. The city of Borneo is altogether built upon piles; and similar constructions have been described by various travellers in New Guinea, Celebes, Solo, Ceram, Mindanao, the Caroline Islands, and elsewhere.§ Dumont D'Urville thus describes the city of Dorei in New Guinea. ‖

"The inhabitants are distributed in four villages at the edge of the water. Each village contains from eight to fifteen houses built on piles; but each house is composed of a row of distinct cells or cabins, separated by a passage which runs from end to

* Quoted from Keller, *l.c.*, pp. 315—317.

† 'Account of the Territory or Dominion of Farney.'

‡ Quoted in Wilde's 'Cat. Mus. Royal Irish Acad.,' p. 232, and Lubbock's 'Prehistoric Times,' pp. 120, 121.

§ 'Prehistoric Times,' pp. 122, 123. ‖ 'Histoire,' vol. iv. p. 607.

end. These buildings are entirely made of wood, very roughly worked; they show the light through in all directions, and often shake when anyone walks over the floor."

The fishermen's huts which still existed in the river Limmat, near Zurich, at the end of the last century were of a similar nature.*

The Bishop of Labuan thus describes the dwellings of the Dyaks:—"They are built along the river-side, on an elevated platform twenty or thirty feet high, in a long row; or rather it is a whole village in one row of some hundreds of feet long. The platforms are first framed with beams, and then crossed with laths about two inches wide and two inches apart, and in this way are well ventilated; and nothing remains on the floors, but all refuse falls through and goes below."†

Captain Burton mentions a visit to an African tribe, the Iso, who, during some forgotten war, fled from Dahome, and established themselves in a lagoon marked in our charts as the Denham Waters.‡ "The Dahomean King is sworn never to lead his army where canoes may be required; these Iso, therefore, have built their huts upon tall poles, about a mile distant from the shore. Their villages at once suggest the Prasian lake-dwellings of Herodotus, and the crannoges of Ireland and the Swiss waters. The people are essentially boatmen; they avoid dry land as much as possible, and though said to be ferocious, they are civil enough to strangers. In June, 1863, I moored my little canoe under one of their huts, and I well remember the grotesque sensation of hearing children, dogs, pigs, and poultry actively engaged aloft."§

In the Paris Exhibition (1867), models of pile-dwellings used by the aborigines of the extreme north of America were exhibited.‖

It has been stated that the natives living near Lake Maracaybo, in South America, erect pile-dwellings over the lake to which they resort, in order to escape from the mosquitos which infest the shore.¶ Lord also mentions that the Indians of the Suman prairie, British Columbia, on the subsidence of the annual floods in May and June, build pile-dwellings over a lake there; to these they retire to escape from the mosquitos which at that period infest the prairie in dense clouds, but will not cross the

* Keller, *l.c.*, p. 318.

† 'Trans. of the Ethno. Soc.,' new series, vol. ii., p. 28.

‡ 'Quarterly Review,' No. 250. October, 1868. p. 429.

§ 'Memoirs Anthropological Soc. of London.' Vol. i., p. 311.

‖ 'Matériaux,' *l.c.*, vol. iii., p. 363.

¶ 'Quarterly Review,' No. 250, October, 1868, p. 429.

water. These stages are reached from the canoes by a ladder made of twisted cedar-bark.*

Pile-Dwellings on the Mainland in Switzerland and Italy.

Antiquities corresponding with those found upon the sites of the Swiss lake-settlements occur at certain places on the *mainland*, as at Ebersberg, near Berg, on the Irchel; Burg, near Vilters; Uetliberg, and Windisch. The place first-named is of especial interest, it was examined, excavated, and reported on by G. von Escher von Berg, first in 1851, and subsequently in 1862. Numbers of antiquities have been found there. It appears to be a settlement on the mainland agreeing with the lake-dwellings of Nidau-Steinberg, both as to the civilization of its inhabitants and the period of its existence; it agrees also in general with all those settlements which were founded in the Stone period, and continued to be inhabited up to and during the Bronze period, but were abandoned before iron came into common use. The stone hatchets, flint knives, stone corn-crushers, tools of horn and bone, as well as the implements and ornaments of bronze, are perfectly identical with the antiquities of the lake-dwellings.†

Remains of pile-dwellings have also been discovered by M. Luigi Pigorini upon the *mainland*, in a spot where no lake has existed, at Castellazzo (Fontanellato), in the province of Parma; indeed, both varieties of pile-dwellings, those constructed over the water and those built upon dry land, appear to have been in use in Italy no less than in Switzerland. Pile-dwellings upon dry land are still erected by the natives in parts of Cochin China, Cambodia, and Siam. ‡

The discovery of remains of non-lacustrine pile-dwellings is rather subversive of a theory lately put forth by M. Hoefer. These lake-habitations, in his opinion, are the *work of beavers;* for—"1. Beavers once abounded in the Helvetian lakes; 2. These constructions are *identical* with those of beavers; 3. They are very near the borders of the lakes; 4. No human bones are found amongst them, but bones of the beaver are there found. The presence of stone or iron weapons merely shows that men in those days hunted the beavers." This theory affords a simple and easy explanation of the origin and use of these singular

* 'Naturalist in Brit. Columbia,' vol. i., pp. 313, 321.

† Keller, *l.c.*, pp. 364—377.

‡ 'Matériaux pour l'Histoire de l'Homme,' vol. ii., p. 24.

structures, provided *all* scientific evidence upon the subject is ignored, and we admit that these pre-historic beavers, after felling trees, and sharpening piles with their teeth, dressed off the marks of gnawing with hatchets, purposely to perplex a future race of archæologists!

Ancient Lake-Dwellings of Italy.

There can be no question that the ancient colonists on the southern slope of the Alps and in Upper Italy lived precisely in the same way as their kindred races in Switzerland, and that their settlements, like those of Meilen and Nidau, were founded in the Stone period, were inhabited during the Bronze period, but were abandoned before the use of iron became known.*

Professor Moro has discovered remains of pile-dwellings in the peat moor of Mercurago, near Arona and Borgo-Ticino, similar to those found in Switzerland. This settlement belongs, it is thought, to the commencement of the Bronze period; at all events, flint flakes and well-made stemmed flint arrow-heads have been found here, as well as bronze pins and a bronze spearhead. The piles appear to have been shaped with a tool having a curved edge, in fact, a species of gouge, for every cut had a kind of hollow. The piles are from 5 to 6½ feet long. In the space (30 feet square) which was examined there were twenty-two upright piles bound together by cross timbers.†

Flint arrow-heads and some objects of bronze have been found in the moor of Gagnano near the peat bog of Borgo-Ticino. Remains of piles similar to those at Mercurago occur here, the only difference being that they have been sharpened by fire at the lower end.‡

In 1863 five pile-dwellings were discovered in the lake Varèse by the Abate Professor Antonio Stoppani; a sixth was subsequently found by the Abate Giovanni Ranchet. The objects obtained from these settlements consist of flint knives, flint arrowheads, flint hatchets, bone implements, and spindle whorls of sandstone and pottery. A *few* bronze implements were found at the settlement nearest to Bodio; these consist of a pin, some fish-hooks, and two spear heads.§

M. le Capitaine Angelo Angelucci examined some pile-dwell-

* Keller, *l.c.*, p. 205. † Keller, *l.c.*, pp. 210—212. 'Lake Habitations of Northern and Central Italy,' by Bartolomeo Gastaldi, trans. by C. H. Chambers, pp. 102—113. ‡ Keller, *l.c.*, p. 213.

§ 'Rapporto sulle Ricerche nel Lago di Varèse.' By the Abate Antonio Stoppani, 1863. Keller, *l.c.*, p. 217. 'Matériaux,' *l.c.*, vol. 1, p. 456. Gastaldi, *l.c.*, pp. 122—124.

ings in the lake Varèse in November and December, 1863. He is of opinion that this station belongs to the Stone period. Only two types of flint arrow-heads were found, a leaf-shaped type, and a finely worked barbed type, with the stem and barbs unusually pointed. Out of two hundred specimens he only met with these two forms. One arrow-head of rock-crystal was the solitary exception; this was stemmed, but was not barbed. The arrow-heads appear to have been made upon the spot, for unfinished and rejected specimens are abundant.*

Pile-dwellings of the Copper and Bronze periods have been met with at Peschiera, on the lake of Garda. M. von Silber, first lieutenant of the Austrian corps of engineers at Verona, appears to have discovered this station in the course of operations carried on in 1860, 1861, and 1862, for deepening the harbour at Peschiera. Dr. E. Freiherr von Sacken also published a full report of this settlement from the account of Captain von Kostersitz.† Professor Abate Stoppani has discovered five other settlements on the lake, namely, two at the island of Lecchi, and three at St. Felice.‡

In 1864, Signor Paolo Lioz discovered remains of a pile-dwelling in the lake of Fimon, south of Vicenza. All the objects belong to the Stone period, and consist of knives and lance-heads of flint, hammers of limestone, bone implements, and pottery. Portions of the clay coverings of the huts were found at this station.§

Pile-dwellings have been found near the convent of Castione, in the district of Borgo San Donnino, in the province of Parma. These piles were originally driven into the bed of the marsh, which has since, as well as the piles, been covered by the "terra-mara" bed; the piles are from 7 to 10 feet long, and their diameter at the top is from $4\frac{1}{2}$ to 7 inches. On the piles are laid beams from 7 to 10 feet long, and on this lies a flooring, made of a single layer of boards, $6\frac{1}{2}$ feet long, from 6 to 13 inches broad, and from $1\frac{1}{4}$ to $1\frac{1}{2}$ inch thick. Lastly, upon the whole is the actual plaster flooring, consisting of a bed of yel-

* 'Le armi di pietra donate da Sua Maestà il Re Vittorio Emmanuele II., al Museo nazionale d'Artiglieria,' Turin, 1865. 'Matériaux,' *l.c*, vol. ii., pp. 86, 90.

† Keller, *l.c.*, pp. 218—221.

‡ 'Sulle antiche abitazioni lacustri del lago di Garda,' in the 'Atti della Societa Ital. Sc. Nat.,' Milan, vol. vi., pp. 181—186, 3rd April, 1864. Mortillet, 'Matériaux pour l'Histoire de l'Homme,' vol. 1, p. 20. Gastaldi, *l.c.*, p. 124.

§ Keller, *l.c.*, p. 222. Gastaldi, *l.c.*, p. 125.

lowish clay marl, about one foot thick, the upper surface of which is smooth and tolerably firm, probably made so by being beaten. The huts appear to have been destroyed by fire. The piles have been sharpened with hatchets, and not by fire. Whole stems were used, chiefly trunks of elm and oak. Stone implements occur, but they are not numerous; the majority of the weapons are of bronze, some of which were cast upon the spot.*

M. Pigorini discovered remains of lake-dwellings of the fascine kind at Priorato, in the Commune of Fontanellato (Parmaisan), belonging to the Iron period.†

M. Canestrini has discovered remains of pile-dwellings in the "terramara" of Gorzano, near Modena. The site of this settlement was exposed during some excavations made for the purpose of extracting the soil for agricultural purposes; 14 piles were found. They were at varying distances from each other. M. Canestrini's letter is dated 29th November, 1867.‡

Ancient Lake-Dwellings of Germany.

The remains of ancient lake-villages similar to those discovered in Switzerland and Italy have been found in various parts of Germany.

Bavaria.—In June, 1864, Professor Desor and M. de Siebold discovered the remains of pile-dwellings of the Stone period on the left shore of the lake of Starnberg.§

Mecklenburg.—In 1863, the remains of pile-dwellings were examined at Gägelow, Wismar, and Trerismühlen, and subsequently Dr. Lisch ascertained the existence of a lake-dwelling in the peat moor (Lattmoor) of the town of Wismar. This low ground was undoubtedly in early times a freshwater lake.

This ancient lake-basin is about ten feet deep, it is at present quite filled with black mould, the remains of leaves, and decayed waterplants. In this mould the piles are to be seen ten feet long and about two feet apart: they have been

* Keller, *l.c.*, pp. 225—231.

† 'Gazetta di Parma,' 17th March, and 2nd August, 1865. 'Matériaux,' *l.c.*, vol. i., p. 302, vol. ii., p. 24. The pile-dwellings of Parmaisan have been described by P. Strobel and L. Pigorini. 'Le Terremare e le Palafitte del Parmense,' published in 'Atti della Soc. Ital. Sci. Nat.,' vol. vi., April and June, 1864. 'Matériaux,' *l.c.*, vol. i., pp. 74—85, 224, 229.

‡ Matériaux,' *l.c.*, vol. iii., pp. 466, 468.

§ 'Journal de Genève,' 19th June, 1864. 'Matériaux pour l'Histoire de l'Homme,' vol. 1, pp. 21, 85, 131. vol. iii., p. 135. See also 'Ueber das Vorkommen von Pfahlbauten in Bayern,' by Moritz Wagner, Munich, 1867.

driven about two feet into the ground. The remains of five huts were also noticed, some of them rectangular, and some of a round form. Upon the black mould which fills the ancient lake basin there is at present a bed of alluvial earth one foot thick, but the heads of the piles do not reach up to it. Above this bed there is a stratum of peat five feet thick.

The antiquities, which were found in considerable numbers amongst the piles, are in general very similar to those of the Swiss lake-dwellings. Flint, however, was used for implements and weapons, instead of serpentine, diorite, &c., as in Switzerland. This lake-dwelling evidently belongs to a late period in the Stone age.

Pomerania.—From the account of Dr. F. Von Hagenow, it appears that he also has discovered a lake-dwelling at Greifswald, in Western Pomerania.* Near Lublow, in the district of Pyritz, Pomerania, a lake-dwelling has been discovered. The piles are of oak; the settlement was destroyed by fire; it belonged to the Stone period; wheat, barley, and peas have been found there.†

Illyria.—Pile-dwellings have been found in the lakes of Carinthia, and amongst others in the lake of Keutschacher, near Klagenfurt. Professor Hochstetter communicated a paper upon the subject to the 'Académie des Sciences,' Vienna, 20th October, 1864, and M. Joseph Ullepitsch has mentioned the discovery in a monthly journal published by the Historical Society of Klagenfurt. ‡

Professor Hochstetter discovered sites of pile-dwellings in four lakes in Carinthia. He examined a settlement in the lake of Reutschach with especial care.§

Ancient Lake-Dwellings of France.

M. Gustave Vallier, of Grenoble, has discovered the remains of pile-dwellings in the lake of Paladru, department of Isère, and has read a paper upon the subject to the 'Académie Delphinale.'‖ He has also described his researches at six stations on this lake in the 'Revue du Lyonnais' of November, 1866.

* Keller, *l.c.*, pp. 378, 379. 'Matériaux,' *l.c.*, vol. 1, pp. 191, 192.

† 'Matériaux,' *l.c.*, vol. ii., p. 166.

‡ 'Carinthia Zeitschrifs für Vaterlands kunde, dehnung und unterhaltung.' Matériaux,' *l.c.*, vol. 1., p. 132.

§ 'Matériaux,' *l.c.*, vol. 1, pp. 335, 336.

‖ 'Matériaux,' *l.c.*, vol. 1, p. 351.

M. Chantre has discovered two stations belonging to the Iron period at Grands-Roseaux and Neyre.*

STRUCTURE OF LAKE-DWELLINGS.

1. Substructure.

1.—*Pile-dwellings.*—What may especially be called pile-dwellings are by far the most numerous variety of lake-habitation in Switzerland and Upper Italy. The ideal restoration in Case D, 21, made under the direction of Dr. Keller, will give a general notion of the construction of this form of lake-dwelling. Piles of various kinds of wood, sometimes split, but in general mere stems with the bark on, sharpened sometimes with the aid of fire, sometimes with stone hatchets, and in later times with tools of bronze and probably of iron, were driven into the shallows of the lakes, provided they were not rocky, at various distances from the shore. These piles were placed sometimes close together, sometimes in pairs, sometimes tolerably wide apart, generally in regular order, but occasionally in apparent confusion. In every instance the heads of the piles were brought to a level, and then the platform beams were laid upon them, which in some cases were fastened by wooden pins, in others mortises or central hollows were cut in the heads of the vertical piles to receive the cross beams. Occasionally cross timbers were joined to the upright piles below the platform to support and steady the structure, either forced in as it were between them or fastened to them by what workmen call "notching," that is, portions were cut out of the vertical piles to receive the cross timbers. The platform lying on the top of this series of piles appears in many cases to have been of the rudest construction, and to have consisted merely of one or two layers of unbarked stems lying parallel one to another; in a few cases, as in one of the Italian lake-dwellings, they were composed of boards, split out of the trunks of trees, and joined with some approach to accuracy.

In many instances the outer row of piles appears to have been covered or closed in by a kind of wattle or hurdle work, made of small twigs or branches, probably to lessen the splash of the water, or to prevent the piles from being injured by floating wood.

The distance of these lake-villages from the shore varied con-

* 'Matériaux,' *l.c.*, vol. iii., pp. 61, 62 (letter dated Lyons, 6th Dec., 1866).

siderably; there appears to have been no regular rule in this respect; it may, however, be well to mention that when a lake-dwelling has been inhabited both in the Stone and in the Bronze period, that part referable to the Bronze period is usually further from the shore and deeper in the lake than that which belongs to the age of Stone. With this exception, as far as can be ascertained, nearly the same mode of construction prevailed in the pile-dwellings during the Stone, Bronze, and Iron periods.

Some few of the lake-settlements appear to have almost touched the shore, but this is exceptional: most of them are at some little distance from it, and in all probability they were connected with it by a narrow platform or bridge supported by piles; in some instances the remains of these bridges have been discovered.

In certain cases, as near Nidau, the pile-dwellings have another peculiarity: they are formed on artificial mounds in the bottom of the lake, made by a large number of stones, which have evidently been brought in boats and sunk on the spot; in fact, one boat, still loaded with the stones which proved too great a cargo for it, and which consequently sunk it to the bottom, is still to be seen at Peter's Island in the Lake of Bienne. This mode of construction (Stein-berg) is not uncommon, especially in the western lakes.

It is impossible, according to the opinions of the best engineers, to drive piles into a heap of stones, consequently the piles must first have been driven more or less deeply into the mud, and the stones must then have been thrown down between and around them, in order to consolidate the structure.

2. *Fascine-dwellings.*—Some lake-dwellings were not supported on piles, but rested upon layers of sticks, or small stems of trees, built up from the bottom of the lake, till the structure reached above the watermark, and on this the platform for the huts was placed. Numerous upright piles are found in dwellings of this description; they were not used, however, to support the platform as in the pile-dwellings proper, but served as stays to the great mass of sticks, which reached down to the bottom of the lake. Fascine-dwellings occur chiefly in the smaller lakes, and apparently belong to the Stone period.

3. *Crannoges, or "Wooden-islands."*—These singular structures bear a great resemblance to the class last described. They have hitherto been found chiefly, if not entirely, in Ireland and Scot-

land. They were first brought into notice by Sir W. R. Wilde, in the proceedings of the Royal Irish Academy for 1840, and several were subsequently described by Mr. Shirley and other writers. The Catalogue of the Museum of the Royal Irish Academy contains notices of several crannoges.* They have also been found in some of the Scotch lakes, especially in Dowalton Loch, which was drained by Sir Wm. Maxwell of Monreith. Several crannoges then discovered have been described by the Duke of Northumberland and Mr. John Stuart. The crannoges, at least in Ireland, were frequently, but not exclusively, placed on natural islands, or on shallows which approached to this character; sometimes they were built up from the bottom of the lake on the soft mud, exactly in the manner of the fascine-dwellings of Switzerland. They are surrounded by a stockade of piles driven into the bed of the lake, so as to enclose either a circle or an oval; the diameter varies from 60 to 130 feet. These piles are usually in a single row, but sometimes the rows are double and even treble. Occasionally the piles are beams, not round stems. The lowest bed within this enclosure is commonly a mass of ferns, branches, and other vegetable matter, generally covered over with a layer of round logs, cut into lengths of from four to six feet, above which is usually found a quantity of clay, gravel, and stones. In almost every case a collection of flat stones was discovered near the centre of the enclosure, apparently serving as a hearth; in some instances two or three such hearths were discovered at different parts of the crannoge. Generally one or more pair of querns were found.†

It will be seen that the crannoges have a great analogy to the fascine-dwellings of Switzerland. This similarity is very striking, when we consider that the Swiss dwellings were evidently places of permanent habitation, that families, and perhaps tribes, lived on them; while the crannoges, as mentioned by Mr. Stuart, are chiefly to be regarded as chieftains' forts, and fastnesses for occasional retreat. Unlike the fascine-dwellings of Switzerland, which belong chiefly, if not exclusively, to the Stone period, the crannoges, whatever may be the age of

* When this Catalogue was published, about forty-six crannoges were known in Ireland—viz., twenty in Leitrim, twelve in Roscommon, two in Cavan, six in Monaghan, and one in each of the counties of Limerick, Meath, Westmeath, Down, King's County, and Tyrone.

† See Report upon the Presentation of Antiquities by the Board of Works, by William T. Mulvany, in the 'Proceedings,' vol. v. App. p. xliv. Wilde, 'Cat. Mus. Royal Irish Acad.' pp. 220—235.

their foundation, continued down to the Iron period; nay, they were actually used at a very late date. In 1246, "Turlough, the son of Hugh O'Conor, made his escape from the crannoge of Lough Leisi, in autumn, having drowned his keepers."* So late as in A.D. 1603, Hugh Boy O'Donnell, having been wounded, "was sent to crannog-na-n-Duini in Ross Guill, in the Tuathas, to be healed." † This wooden house of Duini was situated in the parish of Mevagh, county of Donegal, between Redhaven and Sheephaven.‡

The lake-dwellings of Switzerland, as far as we at present know, disappeared about the first century of our era.

2. Superstructure.

Under this head there is naturally very little to be said. Except under very peculiar circumstances, timber and vegetable material cannot possibly exist long when exposed to the summer's sun and the winter's storms. Still there are indications, although slight ones, as to the construction of the huts.

Upon the main platform it appears that a bed of mud, loam, and gravel was laid, and beaten down firmly, either by the feet or by wooden mallets, of which several have been found. Occasionally a layer of larger pebbles is met with near the top, as in some of the Italian dwellings; probably this was intended to strengthen the plaster floor.

There can be no doubt that small piles or stakes formed the framework of the huts. Some of these have been actually found projecting considerably above the platform. Probably in some cases, especially in the fascine buildings, piles were driven in for this purpose, which did not go quite down to the bottom of the lake; but in the regular pile dwellings, they would only be piles of an extra length.

Of course these piles would mark out the extent of the dwellings themselves, and in one or two favourable instances the ground-plan of a settlement has thus been indicated; we have, however, more than this: the size of the house is further marked out by boards forced in firmly between the piles, and resting edgeways on the platform, thus forming what at the present day we should call the skirting boards of the huts or rooms. It cannot now be determined whether this was continued higher than a single

* 'Annals of the Four Masters.'

† 'Annals of the Four Masters.'

‡ Wilde, 'Cat. Mus. Royal Irish Acad.' p. 233.

board, as no more than this has yet been discovered; but the advantage of even a single plank, set on edge, to keep out wet, wind, and vermin is quite evident. It is also certain that the walls or sides were in a great measure made of a wattle or hurdle-work consisting of small branches, woven in between the upright piles, and covered with a considerable thickness of loam or clay. This is proved by the presence of numerous pieces of half-burnt clay, upon which the impressions of the wattle-work still remain. These singularly illustrative specimens are found in nearly every settlement which has been destroyed by fire.

The evidence which has been collected proves that the greater number of the huts were rectangular; but some of them may possibly have been round; from ancient authors, it is very evident that the huts of many nations on terra firma were round in form, and remains of some ancient circular huts have been discovered in a lake-dwelling in Mecklenburg.*

It is not known whether the huts were divided into several rooms or not; possibly further discoveries may decide this. From the remains of straw and reeds found in every lake-dwelling, it seems almost certain that the huts were thatched with these materials, and it is highly probable that the dormitories were strewed with the softer kinds of straw or hay.

Every hut had its hearth, consisting of three or four large slabs of stone; and it is probable, from the almost universal prevalence of clay weights for weaving, that most, if not all, of them were furnished with a loom. Portions of young trees with the branches partially lopped off are also not uncommon in these dwellings; these would be very convenient, if fastened to the roof or the walls, for the suspension of the mats, the tools, the nets, or the earthenware vessels, some of which seem to have had rope handles.† .

The objects exhibited in the Blackmore Museum have been obtained chiefly from the settlements at Moosseedorf, Robenhausen, and Wangen—all of which stations belong to the Stone period. Some particulars of each station may be desirable before a general description is given of the objects exhibited from them in the collection.

Moosseedorf.

The settlement in this lake is peculiarly interesting on several

* See p. 128. See also remarks upon circular habitations, pp. 58, 59.

† Keller, *l.c.*, pp. 3—8.

accounts; it affords the most perfect example of a regular lake-dwelling of the Stone period; and from the lake having been artificially lowered, a great number of the piles placed near the bank were laid dry. Many particulars relating to the structure of these dwellings were brought to light, and a large number of implements belonging to a very early period were discovered, together with animal remains, some of which belong to the domesticated varieties.

The small lake of Moosseedorf, distant about two hours' walk from Berne, belongs, as its name imports, to that numerous class of lakes in Switzerland called "Moor lakes." Its banks are boggy, the bottom is muddy, and the water is thick in summer. After the water level had been lowered about eight feet in the winter of 1855-6, the remains of two settlements were discovered, one at the eastern and the other at the western extremity. They were investigated by M. Albert Jahn, of Bern, and Dr. Uhlmann, of Münchenbuchsee, and were described by them with great accuracy in a monograph entitled "Die Pfahlbau-Alterthümer in Moosseedorf, Bern, 1857."*

In Case K, 4, are several illustrations taken from Mr. Lee's translation of Dr. Keller's work on the Swiss lake-dwellings; these have been presented to the collection by Mr. Lee. Plate iv. gives the following details of the settlement at Moosseedorf.

Fig 1.—Map of the district—A, Village of Münchenbuchsée; B, Hofwyl; C, Moosseedorf; D, Steinbrück; E, Eastern lake-dwelling; F, Western lake-dwelling; GG, Canal; HI, Commencement of the peat moor; KK, Shell marl (Weisser Grund; *blancfond*); LL, Peat; M, Schönsicht; N, "Molasse" rock; O, Ancient outlet of the lakes; P, Great lake of Moosseedorf; Q, Smaller lake.

Fig. 2.—Ground-plan of part of the eastern settlement, showing the arrangement of the piles; the space comprised within the letters *aa* and *cc* is now lying dry.

Fig. 3.—Section of the eastern settlement; it exhibits the layers of soil on the bank together with the piles. The line A represents the ancient level of the water; the line B the present level; *bb* a bed of mud with roots of reeds, but without any human-worked objects in it; *cc* is the relic-bed, consisting of loose peat, with stones, gravel, wood, charcoal, bones, implements, &c.; the piles pass through this bed into the lower one; *dd*, the ancient bed of the lake, consisting of loam and mud, with remains of shells; *e* is compact peat, see Case D, No. 20;

* Keller, *l.c.*, p. 31.

and *ad* is the summit of the present bank. The eastern settlement, or at least its site, is now in a great measure on dry land; it was formed by a parallelogram of piles driven irregularly into the muddy bottom, and was about fifty-five feet broad, and seventy feet long. The piles consist of stems of fir, oak, birch, and aspen, being the kinds of wood found in the neighbourhood; they are from five to seven inches in thickness, some whole, some split, and many with the bark still remaining. Cross branches resembling a faggot road, appear like the remains of a bridge which connected the settlement with the shore.* Here, as in many other lake-dwellings, the upper structure had been destroyed by fire, and only the burnt wood remained.†

In connection with the settlement of Moosseedorf a discovery made in the immediate neighbourhood is worthy of attention. Every little hillock in the surrounding marshland, still partially covered with peat and hardly rising above its level, appears to have been a place where flint was worked into implements, for nothing else but flint was found in any of them excepting some broken white pebble-stones and traces of charcoal; more than a thousand pieces of flint in flakes, cores, or implements intended for some special purpose, cracked off in all sorts of ways, and afterwards hammered to the required shape, were found in these localities. The flakes are of various sizes, from that of fish-scales up to two inches in length. More or less care was bestowed upon them according to the use for which they were intended.

The colour of these flints varies; they are found white, brown, black, red, and bluish, of all shades, also translucent and like agate and chalcedony. The greater part appear to have

* At Niederwyl, near Frauenfeld, the entire settlement is of this fascine construction. From the nature of the lake-bottom, piles would not have retained their perpendicular position here, even had they not absolutely sunk into the soft, swampy, ground under the heavy pressure of the huts; some few piles, indeed, were driven which acted as stays to the layers of sticks and brushwood. Each bed of brushwood was sunk into its place by a layer of sand and gravel, so that the entire artificial island consisted of alternate beds of faggots and earth, up to the surface of the water. On this fascine foundation a wooden platform was placed, upon which the huts were erected; the stumps of the side-posts of these huts were found, with even the skirting-boards which formed the lowest part of their side walls. The thick earthen floor, laid to keep out the damp, was still to be seen; even the very hearth-stones were in their places on the floor of the huts as when they were deserted.—'Quarterly Review,' No. 250. October, 1868, pp. 426–427.

† Keller, *l.c.*, p. 33.

come from the Swiss Jura (chalk), some few from the Alps. Those of a better kind of stone are doubtless of foreign origin.

The tools used for making these flint implements do not seem to have been of the same material, but of gabbro, a bluish-green and very hard and tough kind of stone. Several of these implements have been met with; their form is very simple, and varies between a cube and an oval. The oval specimens were ground down in one or two places, and the most pointed part was used for hammering.*

Robenhausen.

Robenhausen is a pile-settlement on the lake Pfäffikon, to the north of the lake of Zürich. The details of this settlement are given on Plate vi., Case K, 4.

Fig. 1.—Plan of the lake of Pfäffikon.

Fig. 2.—Ground-plan of part of the Aabach canal.

Fig. 3.—Section of the relic-bed.

Fig. 4.—Section of the Aabach canal.

Fig. 5.—Bank at Himmerich. The former extent of the lake is marked with a black line—the present dimensions of the lake are indicated by a dotted line.

Plate viii.—Piles of the last settlement but one: round fir timber: as seen 20th June, 1865.

Plate ix.—Piles of the latest settlement: split oak stems: as seen 20th June, 1865.

Some years ago, ancient implements were found in the peat near Robenhausen. In January, 1858, however, remains of an extensive lake-settlement were found by Herr Jacob Messikomer, in that part of the moor known as Himeri. Excavations were commenced on a small scale by the Antiquarian Association of Zürich, and subsequently the works connected with the outlet of the water afforded great facilities for the investigation. The careful examination of this remarkable settlement was subsequently undertaken by Herr Messikomer, to whom the public are indebted for an account of the size of the settlement, the construction of the dwellings, and the antiquities which have been found at this station.

The lake-dwelling of Robenhausen is situated in the peat moor on the southern side of the lake of Pfäffikon. The space covered with piles is nearly three acres; it forms an irregular

* Keller, *l.c.*, p. 36.

quadrangle about 2,000 paces from the ancient western shore of the lake, the whole of this distance now consisting of peat, and about 3,000 from the shore in the opposite direction. It was with this last-named side that the settlement, which of course was formerly entirely surrounded with water, communicated by means of a bridge or stage, of which the piles are still visible. The reason why the communication with the land was made in this direction, and not on the side where the land was nearer, appears to be that the gardens and pastures of the colony lay in the sunny district of the village of Kempten.

The substructure of these dwellings was of piles, consisting partly of whole and partly of split stems ten or eleven feet long, of oak, beech, and fir-wood, sharpened at the end with stone-hatchets, and driven a few feet deep into the mud at a distance of from two to three feet apart.*

Later discoveries enabled Herr Messikomer to distinguish the piles of the different settlements from the nature of the wood and the character of the workmanship.—See plates viii. and ix., Case K, 4.

The floor or platform supporting the huts was formed, as is evident from the remains still existing, partly of cross-timbers and partly of boards, which were fastened to the upright piles by wooden pins. The outermost piles are bound together with hurdle-work of branches, large pieces of which have been found.

The Aa brook, now called the Aa canal, or the outlet of the lake, which some years ago was artificially widened and deepened, runs immediately through the settlement. This canal is twenty-seven feet broad, and from eight to nine feet deep, and

* Five of the piles at Meilen, in the best state of preservation, and consisting of fir-wood, were examined by carpenters and joiners, and their unanimous opinion was, that from the nature of the strokes the hewing, or rather the hacking, of the points indicated very clearly the use of the stone hatchet, and that no tool of any kind of metal had been employed about the work. In order to test the possibility of working timber with such tools, and to prevent any doubt which might arise, several trials were made with these stone implements, and Dr. Keller was perfectly convinced of the correctness of the conclusions arrived at. It must, however, be remarked that the trials were made with green wood, and that very probably the builders of the lake-dwellings did not use dry timber, but fresh wood, just as it was brought from the forest. (Keller, *l.c.*, pp. 20, 21.) With regard to the length of the piles, Sir John Lubbock mentions ('Pre-historic Times,' p. 130) that Colonel Suter extracted two piles from the lake-dwelling of Wauwyl, one of which was 14ft. 6in. long, of which 4ft. was in the peat, and the remaining 10ft. 6in. in the sand beneath; the other was only 8ft. 6in. long, 4ft. of which was in the peat, and the other 4ft. 6in. in the solid ground.

the bed of it is thickly set with the stumps of piles placed in double rows, which were broken when this watercourse was put in order.—See plate vi. in Case K, 4.

Peat is found both under and above the floorings at Robenhausen.

Plate vi. fig 2, in Case K, 4, is the ground-plan of a portion of the Aa canal, about sixty feet long; the arrangement of the piles is shown by small circles, and the localities are also noted where the different antiquities were found, at least, where they were of especial interest, either from the quantity found together, or from the nature of the objects themselves. Single specimens of woven or platted cloth are not mentioned, nor are the localities indicated where pottery was found, or the remains of animals which had served for food; all of which were obtained in abundance, and probably were thrown into the water through openings in the timber platform of the lake-dwelling. In like manner the places are not noted where remains of berries, cracked nuts, bones and scales of fishes, were met with, all of which were found lying together in great quantities, as if they had been thrown into the water by the same holes. No notice also is taken of charcoal, which in fact is spread over the whole area. A curious fact is that in many cases objects are found together which have a certain mutual relation. In one place a considerable quantity of corn (wheat and barley) was found together with bread; in another locality these articles of food were found together with burnt apples and pears; in a third, flax and its different manufactures; and in a fourth, these very things were discovered, together with the burnt-clay weights used for the loom. There can be no doubt that in the first-named two localities there were store-houses of different kinds of grain, and that here the corn was bruised and ground, and afterwards either boiled in pots to a kind of porridge, or made into dough with water without separating the bran, and then baked into a kind of cake on hot stones, and under the glowing embers. The large number of granite slabs used for mealing or grinding stones, and found together with the objects last mentioned, prove that the manufacture of meal was carried on here to a considerable extent. The third and fourth localities indicate a large store of flax, which is found here sometimes in skeins or hanks, sometimes spun, platted, or woven in the form of thread, cords, nets, mats, and cloth, just as in a linen-merchant's warehouse.

Stone hatchets, with or without hafts, flint arrow-heads, and

other flint implements are found in abundance scattered on the bed of the canal.

According to the calculation of Herr Messikomer, the area of ground examined by him in the canal contains about 4,000 square feet, which is about one-thirtieth part of the whole settlement. At least 100,000 piles must have been used in the whole structure; and if we join to this consideration the fact that the bones and fragments of pottery were so abundant that every shovelful of mud taken from the bottom of the canal at a depth of six or seven feet contained several specimens, and also that the animal remains and the products of human industry here form a bed at least three feet thick, called the relic-bed, it seems perfectly certain that the settlement lasted many centuries.

Excavations were made by Herr Messikomer, in an area 100 feet long and 50 feet broad, abutting at right angles on the Aa canal, and several most interesting specimens were brought to light, amongst which were a number of wooden bows for shooting arrows, some of which were quite perfect; stone hatchets fixed in their original wooden handles; a stone hatchet fastened in a haft of stag's-horn, which was then fixed in a wooden handle; a flint arrow-head attached to the shaft with cord and asphalt; several implements of maple-wood, some of them perfect and others broken or unfinished; and lastly, a remarkable canoe, made out of a single trunk (Einbaum), such as may now be seen in use on the lakes of Zug and Lucerne, twelve feet long, one and a half foot broad, but only five inches in depth.*

When the settlement of Robenhausen was founded, peat had already begun to form; this continued to grow amongst the forest of piles, treasuring up in its bosom such implements and objects as fell into the water. In this bed of peat can be traced most clearly the different relic-beds which belonged to the successive settlements, as will be seen from the following extract from the report made by Herr Messikomer to the Historical Society of Switzerland, in August, 1865:—

"Anyone who takes the trouble of descending into one of the excavations made in the area of this settlement, and at present kept free from water by pumping, will remark, about ten or eleven feet deep under the surface, a bed of a whitish-grey colour, consisting of the remains of innumerable small shells, and here called 'Weisser Seegrund' (white lake-bottom, or,

* Keller, *l.c.*, pp. 38—41.

shell-marl), but in Thurgau it is called 'Alb.'* In this bed no traces of implements are found, but the points of the lowest series of piles have been driven into it. Above this there is a bed about four or five inches thick, greasy and sticky to the touch, arising from the decomposition of the remains of plants, and having the appearance of peat. Implements are found in this bed, but not abundantly. Above this lies a bed of charcoal, arising from the conflagration of the first settlement: it contains grains of barley and wheat, also threads and pieces of cloth, and fishing-nets, all in beautiful preservation from having been carbonised. From all appearances this first settlement was not of long duration.

"After the catastrophe which had happened to the first dwellings, the colonists erected new huts on the site of their old ones, for above the lowest bed of charcoal we find a bed of peat three feet thick, in which are embedded bones, pottery, &c., and also the material of an ancient flooring. Then follows again a bed of charcoal with corn, apples, pieces of cloth, bones, pottery, and the usual implements of stone and bone. The huts of this *second* settlement were likewise destroyed by fire, as may be clearly seen by the burnt heads of the second series of piles. This settlement was erected more firmly than the previous one, for the piles are so numerous that on the average there are three or four in every square foot. The length of time also that this settlement lasted was much greater, as the bed of peat formed during its existence was much thicker.

"Above the second bed of ashes a new bed of peat is spread about three feet thick; in this there are also the remains of a flooring, as well as a number of stone celts, either broken, half-finished, or in good preservation, some of them are of nephrite." (This material Dr. Keller thinks was derived from the East.† M. Gabriel de Mortillet is of a different opinion. He considers that this substance is not nephrite, but a variety of serpentine obtained from the Alps.‡ He has examined the implements of "nephrite" in the collections of M. Desor at Neuchâtel, of Colonel Schwab at Bienne, of Dr. Uhlmann at Münchenbuchsée, and of the late

* This 'Seegrund,' or shell-marl, which covers the bottom of all the smaller lakes lying in the low districts, and which varies in thickness from a few inches to some feet, and is occasionally burnt for lime, is to be distinguished from the 'blancfond,' which consists of the whitish crust of carbonate of lime, with which the bottom of the larger lakes is partially covered.

† Keller, *l.c.*, p. 18.

‡ 'Matériaux pour l'Histoire de l'Homme,' vol. i., p, 126.

M. Troyon at Lausanne, and in each case he has convinced himself that the material was obtained from the silicious veins which occur in the local serpentines.)* "Pottery was found at Robenhausen, as well as other things usually met with in lake-dwellings. The third settlement must have lasted a long time, but it seems only to have extended over a part of the whole area. It is a singular fact that while the piles of the two first settlements reach down to the shell-marl, those of the third settlement were driven into the mass of ground or material arising from the two first settlements. The piles of the upper settlement also consist entirely of split trunks of oak (see Plate ix., Case K, 4), while those of the two lower ones are round stems of soft kinds of wood (see Plate viii., Case K, 4). It is also remarkable that in the remains of this third erection no signs of any catastrophe by fire are to be discovered, and we may therefore venture to conclude that the colonists, probably compelled by the increase of the peat, left these abodes of their own accord.

"The reason why no corn, apples, or manufactures of flax are found in the upper layer may probably arise from the fact that the latest erection was not burnt; for nearly all the specimens of the above descriptions which have come down to us are in a carbonised condition.

"The uppermost bed of the lake-dwelling area consists, like that of the rest of the moor, of vegetable mould. For when the peat had reached to the surface of the water, its growth was checked, and by the decay of the marsh plants under the influence of the atmosphere, a bed of vegetable mould was formed called peat-earth, which covers the surface of every peat moor.† One of the settlements at Robenhausen appears to have been destroyed by fire during the prevalence of the powerful south wind, so well-known in Switzerland as the 'Fönwind,' by which the burnt materials of the huts were driven across the muddy surface in the exact course of the wind. Herr Messikomer has arrived at this conclusion from the discovery of a strip of peat containing a large quantity of charcoal, only a few hundred paces broad, having its limits clearly defined on either side, and which lies in the precise course that the Fönwind would have taken. Dr. Keller quite supports this view, and appeals to the experience of those who have witnessed the effect of the Fönwind occurring at the time of a calamity of this nature, by which," he adds, "at

* 'Matériaux,' *l.c.*, vol. i, pp. 231, 233.

† Quoted in Keller, *l.c.*, pp. 43, 44.

one time or other nearly every town in central Switzerland has been almost destroyed."*

Dr. Keller considers that each hut was inhabited by one family, which had its own arrangements for preparing victuals, and for spinning and weaving the clothing needed by the inmates. This opinion is founded in part upon the discovery made by Herr Messikomer, of six huts at Robenhausen, which had stood close to each other, and in each of which was a stone corn-crusher, a quantity of corn, pieces of woven cloth, stores of raw flax, together with clay loom-weights, and great stones which had formed the hearths. The length and breadth of these huts correspond exactly with those of some dwellings examined at Niederwyl, namely, twenty-seven feet by twenty-two.†

Wangen.

When the first account was published of the discovery of pile-dwellings, at Meilen, Herr Löhle remembered having seen similar remains near his house at Wangen, and accordingly, in the autumn of 1856, he began to collect the antiquities found on the shore of the Untersee. He subsequently excavated and laid bare a considerable portion of the area occupied by the lake-dwelling, and was rewarded by the discovery of several things not previously met with, such as ears of barley and woven linen cloth, besides a very large number of stone and bone implements.

The lake-settlement of Wangen lies to the east of the village; the piles run along the shore, now partially encroaching upon it, and form a parallelogram of more than seven hundred paces long and one hundred and twenty paces broad.‡

The piles consist of the different kinds of wood growing in the neighbourhood—viz., oak, beech, elm, birch, fir, ash, alder, maple, and two kinds of willow. They are either whole stems, or they are trunks split into two or three parts; and they have been sharpened in some cases by fire, and in others with stone hatchets.

They were driven in for the most part one or more feet apart, so that in the space of a square rod at least twelve, though sometimes seventeen or twenty-one may be seen. In some places, however, where a firmer support was necessary,

* Keller, *l.c.*, p. 47.
† Keller, *l.c.*, p. 46.
‡ Keller, *l.c.*, p. 60.

three or four piles are found driven in close together. The whole number of piles forming the substructure of this settlement is estimated by Herr Löhle at from 40,000 to 50,000.

Of all the dwellings of the olden time yet examined, none has afforded such an abundance of implements as Wangen; they were found in the "relic-bed," about two feet below the surface. Many hundreds of stone-hatchets were obtained of different sizes and shapes, and in every stage of manufacture, a convincing proof that they were made on the spot.* The workmanship of the stone implements found at Wangen is very inferior to that of the corresponding objects met with at other stations.

Cylindrical hammers of serpentine, with a haft hole, and indeed perforated stone tools of any kind, are the greatest rarities; whilst stone hammers of a cubical form, with the edges rounded, made out of hard sandstone, are very numerous. Cutting tools of yellowish black and red flint, such as saws hafted in wood and fastened with asphalt, and arrow and lance heads, are found in tolerable abundance. As this kind of flint is chiefly met with in the neighbouring parts of France, it is probable that the material was obtained by barter.

Pointed tools, chisels, arrow-heads, &c., made of the bones of red-deer, roe-deer, and other animals, and even of birds, have been found in large numbers and of a great variety of shapes; so also have large pointed implements, awls or piercing tools, daggers and lance-points made from stag's horn. Some of the bone arrow-heads have the asphalt still remaining which helped to fasten them to the shaft.†

The earthenware vessels are not different, either in form or material, from those found at Meilen, Robenhausen, and Moosseedorf. Even the ornaments, consisting of impressions and bosses, are exactly the same. Most of the vessels are of very simple form, approaching that of a cylinder, and many of them are coated either inside or outside with a thick covering of soot.

Spindle-whorls of clay are found in abundance.

Perforated balls of clay, mixed with a large quantity of charcoal-powder, like the material of the conical loom-weights found at Robenhausen, are also met with by dozens.

Grinding stones and hearth-stones are very abundant.

Large quantities of corn have been found, both in whole ears

* The stone hatchets and implements found at Meilen were also manufactured on the spot. Not only have they been met with in all stages up to the finished tool, but the waste fragments are also present. (Keller, *l.c.*, p. 19.)

† Keller, *l.c.*, pp. 61, 62.

and in separate grains, but always in a burnt state: the two-rowed barley (*Hordeum distichum*) and wheat, both of excellent quality, may be easily recognised. Of wheat there are two varieties, the common wheat and the two-rowed corn, or what is called summer corn. In one place where there was doubtless a store, more than a bushel was found. The fruits of the wild apple and of the wild pear were also met with in a similarly carbonised condition.

Herr Löhle believes that in the course of several excavations which have been made by him, he has obtained altogether about one hundred bushels of corn of various kinds, so that there can be no doubt that the lake-dwellers carried on agriculture to a considerable extent. It is also a matter of peculiar interest to find that, in one of his later excavations, Herr Löhle has discovered baked bread, made of the crushed corn, precisely similar to that found about the same time by Herr Messikomer at Robenhausen. Of course it has been burnt or charred, and thus these interesting specimens have been preserved to the present day. The form of these cakes is somewhat round, about an inch or an inch and a half high—one small specimen, nearly perfect, is about four or five inches in diameter. The dough did not consist of meal, but of grains of corn, more or less crushed. In some specimens the halves of grains of barley are plainly discernible. The under-side of these cakes is sometimes flat, sometimes concave, and there appears no doubt that the mass of dough was baked by being laid on hot stones and covered over with glowing ashes.

It was not entirely for the production of corn that the ground was cultivated; the growth and manufacture of flax evidently occupied no small share of the attention of the lake-dwellers: flax is found in all stages, from the unworked stems with the seed-capsules still adhering to them, and in perfect preservation, to specimens of platted or woven cloth.

In the same bed of mud which contained the remains of piles and household implements, there were found, as in other lake-dwellings, quantities of moss, rushes, bark of trees, wisps of straw and small twigs, part of which probably formed the roofs of the huts, and part may have served for the bedding of the inhabitants.

Besides the different kinds of wood used for piles, as before stated, some other kinds were found at Wangen, such as the hazel, the apple, and the pear-tree. The stems of the two last were not used for piles, but for hewing blocks on which the lake-dwellers

worked; they were found lying down and partially burnt: they are about a foot and a half in diameter, and two or three feet long. Fir-wood and the kinds allied to it are rare, doubtless because it was not to be obtained conveniently; for the pine forests are on the mountain heights, at some distance from the shore.*

Herr Löhle has observed that the antiquities at Wangen are by no means evenly spread over the whole area of the settlement, but there are certain places where they are found in greater abundance than in others; and there are also places which have proved entirely barren, even after a very careful search. Thus the burnt or charred flax is only found in certain localities tolerably well defined, and from four to six square rods in extent; but it is there found in all stages of manufacture; in stems with the seed-vessels still remaining; in bundles, or what are technically called 'heads,' very well put together; spun into threads; or made into neat and artistic plait with bands of willow-bark or withy-peel. Dr. Keller thinks that Herr Löhle is quite right in supposing that these places must have been the spinning-rooms of the lake-dwellers, or their store-rooms for flax in its different stages; there are also localities where straw and straw-plait are plentiful.

There are certain other peculiarities respecting the antiquities found at Wangen which are worthy of notice. Notwithstanding the very large area which has been examined, and the great quantity of stone implements which have come to light, only one single case has occurred of the hatchet having been found hafted in stag's horn like those which are found abundantly in nearly all the older lake-settlements. The mode in which the stone hatchets here were almost exclusively hafted was by means of a forked branch of a tree, one portion of which, intended to receive the celt, was cut off some inches above the joint or point of junction, and then split; the other was left long, so as to be used as a handle. As in the case of similar implements made by the aborigines of North America, it was quite necessary, in order to fasten the hatchet, to have the two parts of the split branch bound round tightly by strings of bast, or vegetable fibre, flax-cords, or thongs of leather. From the length of the handle, Herr Löhle concludes that these tools were used sometimes with one hand and sometimes with two.† The kinds of wood used for these handles were chiefly the hazel and the willow.

* Keller, *l.c.*, pp. 62, 63.

† The Klah-o-quaht Indians use their shell adzes either with one hand or with both, according to the size of the tool. See page 68.

One or two more peculiarities of the settlement of Wangen may be mentioned: the perforated balls of clay, mixed with charcoal, seem to be found in no other station; while the black perforated cones of similar material, so abundant at Robenhausen, are not met with here.

On the whole, this settlement appears to belong purely to the Stone period, and this is the more remarkable, as the inhabitants evidently were pre-eminent both as agriculturists and as handicraftsmen. They produced many sorts of corn, and flax, and they manufactured several descriptions of both plaited and woven cloth. All these productions, the result apparently of a settled mode of life, and of peaceful industry, stand in striking contrast with the wretched implements and tools of bone, stone, and wood which were in daily use by them.*

Fauna of the Lake-Dwellings.

It has been mentioned that the specimens in the Collection representing the fauna of the lake-dwellings are not exhibited, from want of space. A list of these specimens will be given at some future time, when a catalogue of the animal remains from the drift is published.

All the animal bones found upon the sites of the pfahlbauten are in the same fragmentary condition as those from the kjökkenmöddings. They also bear the marks of knives, and certain of them have been opened for the sake of the marrow. Bones of urus, auroch, and elk, none of which are now living in Switzerland, are present with the antiquities of the pfahlbauten. The domestic cat and the barn-door fowl are absent, both from the lake-habitations of Switzerland, and from the kjökkenmöddings of Denmark. Some curious evidence of the relative age of pile-dwellings of the Stone period is afforded by the animal remains found at the different stations. Thus, at the older settlements, such as Moosseedorf and Robenhausen, remains of the stag are more abundant than those of the ox. At the more modern stations of Wangen and Meilen, the reverse is the case. The domestic hog of the present race is absent from all the pile-dwellings of the Stone period, excepting the one at Wauwyl.

Lake-Dwellings of the Bronze Period.

At a certain period in their history the Swiss lake-tribes

* Keller, *l.c.*, pp. 64, 65.

became acquainted with the use of bronze; they entered upon their Bronze period. It is possible that they may have acquired their knowledge of the valuable properties of this alloy from others, but it is highly probable that the lake-people made the discovery for themselves; be this as it may, they do not appear to have obtained the finished bronze weapons and implements by barter, but to have mixed the metals and to have cast the objects on the spots where they were discovered, and, in fact, a bronze mould for casting celts has been found at Morges.* M. von Fellenberg thinks that the copper used in making some of the bronze celts was obtained from the Valais.† The possession of bronze at once made a difference in the habits of the people and in the construction of their settlements. This can be traced at Meilen, which belongs almost exclusively to the Stone period; a bronze armlet and a single bronze celt have, however, been found there, showing that the metal had made its appearance in this settlement; most of the piles had been rudely pointed with stone hatchets, sometimes with the aid of fire, but a very small number were found which had been cut with a *metal* hatchet. The difference has been well described as like that which exists between a well and a badly-cut lead pencil. This is not all; for the increased facility which bronze hatchets gave in pile-making, is seen by the villages of the Bronze period being set in deeper water, farther from the shore, than was the case with settlements of the Stone period.‡

No objects from lake-dwellings of the Bronze period are in the Collection, with the exception of one hair-pin, upon tablet 4 in Case C 48.§ During the Bronze period, the pile-dwellings were confined to the lakes of Western Switzerland. Those belonging to the Iron period have as yet been found only in the lakes of Bienne and Neuchâtel.‖

* Keller, *l.c.*, plate xxxix., fig. 6—8, p. 278.

† The bronze of many of the weapons and implements discovered in the western part of Switzerland consists of pure tin mixed with copper in which there is a little nickel; no trace of the latter metal is to be found in bronze objects met with elsewhere. As mines of copper and nickel, which last are worked at the present day, are found close together in the Vale of Anniviers, in the Valais, M. von Fellenberg conjectures that the copper of the implements containing nickel has come from the Valais.

‡ Keller, *l.c.*, p. 363, and 'Quarterly Review,' No. 250, Oct., 1868, p. 433.

§ For notices of the Swiss lake-dwellings of the Bronze period see 'Prehistoric Times,' Keller's 'Lake-Dwellings,' and Desor's 'Les Palafittes.'

‖ Although weapons and implements of wholly new forms appear during the Iron and the Bronze periods, with the new materials, yet it is interesting to find

By all who take an interest in the problem whether or not human civilisation is to be considered a product of gradual development upward from an early savage state of mankind, it will be seen as a highly important fact that the history of the Swiss lake-dwellers is the history of a gradual development in civilisation. The Swiss lake-dwellers make their first appearance as thoroughly in the Stone age as the South Sea Islanders who planted the iron nails in expectation of reaping a crop of these useful vegetables. At Wangen, or Moosseedorf, or at the fascine settlement of Wauwyl, there has not been found among the thousands of stone hatchets, knives, and arrow-heads, any trace of metal. The lake-people must have lived for many centuries in such places as these, having only implements of stone, horn, and bone, some of which were of inferior workmanship to those of many modern savages.*

THE OBJECTS FROM THE PILE-DWELLINGS OF SWITZERLAND ARE EXHIBITED IN CASES A 31 TO A 33, B 26 TO B 29, C 19 TO C 21, AND D 20 AND D 21.

A 31.

In this Case are some stag's horn hafts for stone hatchets: some of the hatchets being still in the original sockets. They are chiefly from Robenhausen and Wangen; some pointed bone tools are also shown from the same localities.

A great number of the stone implements found at Meilen were still in the original sockets, made of stag's horn.† A piece of the antler was cut of the requisite length and thickness, in which a hole was worked out at one end, wide and deep enough to receive the upper end of the hatchet. The other end was cut into a four-sided tenon or plug, which fitted into the wooden handle.‡ The perfect implement, complete in all three parts,

that copies of the bronze axes made in iron are found, just as the earlier bronze celts were made like the *still* earlier stone hatchets.

* 'Quarterly Review,' No. 250, October, 1868, pp. 431—432.

† These horns, in Dr. Keller's opinion, have been cut with implements of stone only. The material was worked when fresh, perhaps after it had been softened by steeping in water. Keller, *l.c.*, p. 21.

‡ Troyon, 'Habitations Lacustres,' plate iii., fig. 3; in the same plate are figures of handles made entirely of stag's horn, fig. 1, 2, and 7: all of these were found at Concise. Other specimens of stag's horn sockets are figured in plate iv.

has been found at some of the stations. See models from Moosseedorf and Concise, upon the top of Case H 8, the originals of which are in the collections of Dr. Uhlmann and the late M. Troyon; the latter collection is now preserved in the Public Museum at Lausanne.

Two stone hatchets in the original handles of wood were in the magnificent collection of Dr. Clément in the Paris Exhibition, 1867; the handle of one, found at Concise, was of yew, with a socket of stag's horn,* the handle of the other was entirely of ash-wood. Dr. Clément also exhibited an exquisitely finished chisel of "nephrite" in its original handle of stag's horn; it was found at St. Aubin.†

Three stone hatchets fixed in their original handles of wood, without any intermediate sockets, found at Robenhausen, have been figured.‡ Another specimen from the same station, with a stag's horn socket and an ash wood handle, has also been figured,§ as well as a stone hatchet mounted in the root of a maple tree, the implement being lashed to a kind of projecting beak worked out from the wood.‖ In the "Clément Collection" at the Paris Exhibition, 1867, was a stone adze in its original handle of yew wood found at St. Aubin; the implement rested upon a wooden beak projecting from the handle. A handle of the same description found in the lake of Luissel has been figured.¶

A stone hatchet hafted in the root of a hazel bush has been found at Robenhausen;** the implement is placed between two projecting rootlets standing at right angles, or nearly so, with the main root, to which it is fastened by cords.

A serpentine hatchet set in a stag's horn socket,†† and a stone hatchet in a complete handle of stag's horn,‡‡ both from Wauwyl, have been figured. Three stone implements hafted in stag's horn, found at Meilen, have also been figured.§§ It is not only in the pfahlbauten that stone hatchets with their handles are obtained; a stone hatchet in its original wooden handle

* Desor, 'Les Palafittes,' fig. 17.
† Desor, *l.c.*, fig. 19.
‡ Keller, *l.c.*, plate viii., fig. 4, plate xi., fig. 1, plate x., fig. 14.
§ Keller, *l.c.*, plate x., fig. 7.
‖ Keller, *l.c.*, plate xi., fig. 2.
¶ Troyon, 'Habitations Lacustres,' plate iii., fig. 9.
** Keller, *l.c.*, plate x., fig. 16.
†† Keller, *l.c.*, plate xx., fig. 2.
‡‡ Keller, *l.c.*, plate xxii., fig. 7.
§§ Keller, *l.c.*, plate ii., fig. 2—4.

was found in the Solway Moss,* it is now preserved in the British Museum. Another stone hatchet with a portion of its original handle was found at Tranmere, Cheshire; it is now in the Museum recently presented to the town of Liverpool by Mr. Joseph Mayer, F.S.A. Another example is figured in Wilde's Catalogue of the Museum of the Royal Irish Academy:† it was found in the county of Monaghan, Ireland.‡

A 32.

Nos. 1 and 13 are pieces of stone, showing marks of sawing. The other specimens in this Case are stone hatchets from Wangen, some of which, such as Nos. 6 and 8, appear to have been blunted by use.

The mode by which stone hatchets were made by the lake-dwellers has been described by the late M. Troyon. The block of stone was in the first place reduced to a suitable size with a hammer stone; the outline was then marked out by grooves worked to a depth sufficient to weaken the stone, and the projecting portions were then removed by a skilful blow with a hammer, after which the implement was smoothed and sharpened upon a flat grinding stone. The specimens Nos. 1 and 13, in this Case, show marks of sawing, and many of the hatchets have similar marks half way through their thickness.§ The lake-dwellers worked bone in a similar manner. See No. 23, Case D 20.

A 33

Contains a series of stone hatchets. Nos. 1 to 11 are from Wangen; Nos. 12 to 19 from Moosseedorf; Nos. 20 and 21 from Concise; Nos. 22 to 26 from Lausanne; and Nos. 27 to 41 from Robenhausen.

A very large number of stone hatchets have been found in the lake-villages; nearly 1000 were obtained at Nussdorf alone, 50 of these are of the so-called nephrite.‖ Almost every variety of type exists among the stone hatchets found at Nussdorf; the section of some is absolutely circular, with all intermediate forms, to an elongated oval; others are in section, rectangular, but made with curved lines; whilst some range in section, from a

* 'Proceedings of Soc. of Antiquaries,' vol. iv., p. 112.

† p. 46. See also 'Archæo. Journal,' vol. iv., p. 3.

‡ 'Horæ Ferales,' p. 134.

§ See remarks upon the mode of sawing stone with a cord, p. 118.

‖ See page 140.

square to an elongated rectangular figure. It has been suggested that many of the stone hatchets were used unmounted; out of the large number found at Nussdorf only three were met with in sockets of stag's horn, and all of these belong to the smaller implements with the rectangular section.* It is probable, therefore, that only the smaller hatchets were hafted, and that the larger implements, with a round or oval section, were complete tools in themselves and needed no handles.†

Drilled stone axes are much more rare at lake-villages of the Stone period, such as Nussdorf, than ordinary stone hatchets. Only 50 with drilled holes were found at Nussdorf, and very few of these are perfect;‡ some of them are very nicely worked, and probably are referable to a late period in the Stone age.§ Dr. Clément exhibited drilled axes of serpentine, from Concise and St. Aubin, at Paris, in 1867.

Several drilled stone axes found at Concise have been figured.‖

M. Alphonse Baux has expressed his opinion ¶ that archæologists are wrong in assigning all drilled stone axes to the Bronze period.**

M. Gabriel de Mortillet agrees with M. Baux that some drilled stone axes belong to the Stone period. He thinks that three methods have been adopted for drilling stone axes. In one mode a flint-flake was the tool used; with it a circle (or the nearest approach to a true circle which the workman could make) was described upon the intended axe, and this was deepened by degrees, leaving a central cylinder or core, which being at last detached, the perforation was completed.†† This mode of drilling, or rather of carving out, a hole belongs to the Stone period, as does also the second method, which was effected by revolving a tool in the manner of a fire-drill,‡‡ either by hand or with a cord, upon the object to be perforated.§§ The third process,

* Keller, *l.c.*, plate xxvii., fig. 16 and 19.

† Keller, *l.c.*, 109.

‡ Keller, *l.c.*, plate xxvii., fig. 4, 11, 22, and 24, all of which are broken across the haft-hole.

§ Keller, *l.c.*, plate xxvii., fig. 23, a, b, and fig. 22.

‖ Keller, *l.c.*, plate liv., fig. 1, 2. Desor, 'Les Palafittes,' fig. 13, 14. Troyon, 'Habitations Lacustres,' plate viii., fig. 1 and 3. Figs. 2 and 3 in the same plate are portions of drilled stone-axes, broken in the process of drilling.

¶ Letter written from Marseilles, 15th Feb., 1868.

** See page 38.

†† 'Matériaux,' *l.c.*, vol. iii., p. 264.

‡‡ See page 96—98.

§§ 'Matériaux,' *l.c.*, vol. iii., p. 294.

viz., by making the hole with a hollow circular tool, belongs to the Bronze period.*

M. Baux agrees with M. G. de Mortillet that drilling, in some cases, was effected with a flint-flake. He also admits the use of the ordinary drill by the Swiss lake-dwellers, and he instances four halves of serpentine axes, which he saw taken from the station of Auvernier, Lake of Neuchâtel, two of which were unfinished, and had been broken in the process of drilling when nearly completed. The circular striations within the hole proved the use of a revolving tool, whilst from the nature of the work, it was clear that a hollow drill had not been employed. From the same station (Auvernier) M. Baux, however, obtained a stone core, such as would have resulted from the use of a hollow drill. The tool appears to have been very inefficient, and to have slipped during the work. Professor Desor mentions that stone cores resulting from the use of hollow drills are not uncommon.†

One of these stone cores, not, however, obtained from a lake-dwelling, has been figured in the "Matériaux;"‡ it was found in Lithuania. The writer of this notice had a similar core sent to him, with other objects, from the Paris Exhibition, 1867.

Several unfinished drilled stone axes were in the "Clément Collection" at the Paris Exhibition, 1867, which had the central cores still attached.

A stone axe partially drilled from both sides, found at Sipplingen, Ueberlinger See, has been figured.§ A hollow drill was used in this instance, for the core still remains attached at the bottom of the perforation on each side of the implement.

A similar specimen, found at Concise, has been figured.‖

M. Franck de Truget¶ imagines that he has met with one form of tool employed for drilling stone axes. He obtained it from the Lake of Neuchâtel. It is a piece of sandstone 6 cent. long, and 2½ cent. broad at the base; it is stated to be much worn from use.**

The tool used for drilling appears sometimes to have had a central projection, almost like that of a modern centre-bit, as

* 'Matériaux,' *l.c.*, vol. iii., p. 307.

† 'Les Palafittes,' p. 19.

‡ Vol. i., p. 463, fig. 3.

§ Keller, *l.c.*, plate xxviii., fig. 2.

‖ Troyon, 'Habitations Lacustres,' plate viii., fig. 4.

¶ Letter written from Treytel, 22nd May, 1868.

** 'Matériaux,' *l.c.*, vol. iv., p. 293.

may be seen in the perforation of a stone axe, found at Allensbach, Untersee.*

The occurrence of stone axes with an oval and not a circular perforation, however, affords tolerably conclusive evidence that the boring was not effected, entirely, with a revolving tool. The halves of two stone axes with oval haft holes, found at Nussdorf, have been figured.† Mr. J. E. Lee, F.S.A., is of opinion that when an oval hole had to be made, two circular holes were drilled, and the intermediate piece was afterwards sawn out; a method still adopted by carpenters.

A very remarkable specimen, found at Estavayer, Lake of Neuchâtel, has been figured.‡ It is a drilled stone axe; the material (diorite) is believed not to occur in Switzerland. The form is elegant, with an ornamental ridge running down the centre; the hole is oval, measuring about one and one-seventh inch long and three-fourths of an inch broad.

An effort has frequently been made to utilise a broken drilled axe, for a second hole is often either commenced or completed above the fractured part.§

D 20

Contains portions of the piles from Moosseedorf, Nos. 32 to 34. The head of a pile, with a mortise cut in it to receive the timber of the platform, found at Robenhausen, has been figured by Mr. Lee.‖ Similar heads of piles were found at Niederwyl. Specimens of various kinds of wood, Nos. 35 to 39, are shown from Moosseedorf; Nos. 16 to 20, and 24 to 30, are pieces of stag's horn partly worked into mounts for hatchets; No. 27 is made into a chisel; No. 31 is a portion of a shed antler of red deer, showing marks of hacking with some rude tool, probably a stone hatchet; Nos 21 and 23 are fragments of bone, bearing marks of sawing and human workmanship; Nos. 9 to 15, and 40 to 53, are fragments of pottery from Moosseedorf, Robenhausen, and Wangen.

The potter's wheel was probably unknown to the lake-dwellers of the Stone period;¶ the baking of the pottery is very imperfect, and appears to have taken place in an open fire. The material is usually rude and coarse. Many of the vessels have

* Keller, *l.c.*, plate xxv., fig. 1.

† Keller, *l.c.*, plate xxvii., fig. 11 and 24.

‡ Keller, *l.c.*, plate xlviii., fig. 29, p. 158.

§ Keller, *l.c.*, plate xxvii., fig. 24.

‖ Keller, *l.c.*, plate xiii., fig. 7.

¶ Pottery made on the wheel has been found at Concise.—Keller, *l.c.*, p. 179.

small projections, which are pierced in such a manner that strings might be passed through them to serve as handles. Some of the vessels, also, are pierced by small holes at different levels; it has been suggested that these may have been used in the preparation of curds, the small holes being intended to permit the escape of the whey. No representation of any animal or vegetable has yet been met with upon the pottery from the pfahlbauten.*

Nos. 1 to 5 are portions of grindstones for hatchets, from Wangen, Concise, and Moosseedorf.

It has been mentioned † that during the Stone period the use of revolving grindstones was unknown.

Grindstones for celts have been figured, from Meilen ‡ and Wauwyl. §

A very interesting grindstone, not, however, found in the lake-dwellings, has been figured. Its surface is covered with grooves of various sizes and depths caused by the polishing of different stone implements. ‖

No. 6 is a mass of baked clay from Wangen, probably part of the wattle-work of one of the dwellings.

D 21

Contains the ideal restoration of a pile-dwelling, made under the direction of Dr. Keller (scale one-twentieth of supposed dimensions). Nos. 30 to 45 are fragments of pottery, chiefly from Wangen. Nos. 11 to 15 are bone tools; No. 16, bones split for the extraction of marrow; Nos. 17 and 19, gnawed bones; Nos. 20 and 21, bones and teeth of beaver; and No. 22 are the bones of some bird.

A new room at the Museum of St. Germain was opened to the public on the 15th August, 1868. In this room some most illustrative series of objects are exhibited. Among these are bones recently gnawed by hyena, dog, porcupine, and squirrel, as well as pieces of stone, horn, and bone worked with tools of flint, bronze, and iron. In 1867, the writer of this notice, whilst at St. Germain, was shown, by MM. Bertrand and Mortillet, a slab of granite upon which objects, similar to those represented in the dolmen sculptures, had been carved with

* 'Pre-historic Times,' p. 135.

† Page 102. See also page 106.

‡ Keller, *l.c.*, plate iii., fig. 23.

§ Keller, *l.c.*, plate, xx., fig. 6.

‖ 'Matériaux,' *l.c.*, vol. ii., pp. 419—421. Louis Leguay, 'Note sur une pierre à polir les silex, trouvée, en Septr., 1860, à la Varenne-Saint-Hilaire (Seine), au lieu dit la Pierre-au-Prêtre.' M. Peigné-Delacourt, 'Notice raisonnée sur deux instruments inédits de l'age de pierre.'

ancient implements of flint and bronze; the tools with which the work had been executed were shown at the same time, and unquestionably the flint chisel had stood the test better than the bronze celt.

Flora of the Lake-Dwellings.

All the cultivated plants of the pfahlbauten show a connection with the countries of the Mediterranean; every kind of corn came from that quarter; the lake-dwellers not only cultivated the same barley, but even the same variety as the inhabitants of Southern Italy. Lest it might be supposed that seeds and objects of later times have become mixed with those belonging to the lake-settlements, it is satisfactory to know that in the old seeds, the inside portions, the germ and albuminous part, have disappeared, and only the burnt cellular part, which forms the seed-shell, or pericarp, has remained.

The destruction by fire of several of the lake-villages, strange as it may appear, has really preserved many interesting objects, of the existence of which we should otherwise have remained in ignorance; such specimens are found in a carbonised state, charcoal being very imperishable. The origin of these conflagrations has been explained in two ways. Dr. Keller and others consider that they have arisen from ordinary causes, the late M. Troyon was of opinion that they resulted from the attacks of enemies; if so, as Sir John Lubbock has remarked, we ought to have found remains of the slain, whereas human remains are very scarce in the lake-settlements,* and it is probable that the presence of those that are met with has resulted from accident, particularly as the remains of adults are less numerous than those of children.†

In Case K 4 are representations of the various cereals found in the lake-dwellings.‡

Figs. 1 to 8.—Small lake-dwelling barley (*Hordeum hexastichum sanctum*).

Fig. 9.—Compact six-rowed barley (*H. hexastichum densum*).

Figs. 10 to 13.—Ancient Italian silver coins. The six-rowed barley is faithfully delineated on the most ancient coins of Metapontum, see Fig. 10, which represents a coin belonging to about the 6th century B.C. This barley is still more accurately

* 'Prehistoric Times,' p. 162.

† 'Pre-historic Times,' p. 156.

‡ Plates lxxxvii. and lxxxviii. of Mr. Lee's translation of Dr. Keller's work upon the "Lake-Dwellings," from which the description of the objects is given.

given on coins of the 5th century B.C. (Figs. 11 and 12). On the coins of Leontini (Fig. 13), an ancient Sicilian town, grains of the ancient type of barley are represented ; they exactly agree with those of the small lake-dwelling barley.

Figs. 14 to 18.—Small lake-dwelling wheat (*Triticum vulgare antiquorum*).

Fig. 19.—Beardless compact wheat (*Triticum vulgare compactum muticum*).

Fig. 20.—Egyptian wheat (*Triticum turgidum*).

Fig. 21.—Grains of the above.

Fig. 22.—Spelt (*Triticum spelta*).

Fig. 23.—Lake-dwelling "Emmer" (*Triticum dicoccum*).

Fig. 24.—Oat (*Avena sativa*).

Fig. 25.—Rye (*Secale cereale*).

Fig. 26.—Millet (*Panicum miliaceum*).

Fig. 27.—Single grains magnified.

Fig. 28.—Italian setaria (*Setaria Italica*).

Fig. 29.—Grains magnified.

THE SEEDS FROM THE LAKE-DWELLINGS IN THE COLLECTION ARE SHOWN IN

B 26.

CEREALS.

Tablet 1.—Compact six-rowed barley (*Hordeum hexastichum densum*), Robenhausen.

Tablet 2 (*a*).—Small lake-dwelling wheat (*Triticum vulgare antiquorum*), Robenhausen.

(*c*).—Beardless compact wheat (*T. vulg. compactum muticum*), Robenhausen.

(*b*).—Compact six-rowed barley (*Hordeum hexastichum densum*), Robenhausen.

(*d* and *f*).—Portions of ears of compact six-rowed barley (*H. hexast. densum*), Robenhausen.

(*e*).—Small lake-dwelling barley (*H. hexast. sanctum*), Robenhausen.

Tablet 3.—Wheat (in masses), Wangen.

Tablet 4, (*a*, *b*, and *c*).—Small lake-dwelling wheat (*T. vulgare antiq.*), Robenhausen.

Tablet 5, (*a*).—Beardless compact wheat (*T. vulgare compactum muticum*), Moosseedorf.

(*b*).—Small lake-dwelling wheat (*T. vulg. antiq.*), Moosseedorf.

Tablet 6.—A mass of wheat taken from a barn at Winterborne

Monkton, Wilts, which was destroyed by fire in April, 1864. This is exhibited to show how closely the condition and appearance of the grains correspond with those from the pfahlbauten.

Of the cereals from the lake-dwellings, the small lake-dwelling barley (*Hordeum hexastichum sanctum*), and the small lake-dwelling wheat (*Triticum vulgare antiquorum*), are the most ancient. Next to these come the beardless compact wheat (*Triticum vulgare compactum muticum*), and the larger six-rowed barley (*Hordeum hexastichum densum*).

It is believed that the lake-dwellers prepared and sowed their fields in the spring, and not in the autumn.

It is also probable that the corn was not cut off just under the ears (a mode represented on some Italian coins), but that the straw was taken with it; otherwise there would not have been the seeds of so many weeds with the corn.

B 26.

Upon tablets 7 and 8, are specimens of bread (burnt) from the stations of Robenhausen and Wangen.

When the Aa canal (Robenhausen) was deepened and altered, the quantity of bread found was considerable. The entire weight was about 8lb., which would probably correspond with newly-baked bread weighing about 40lb.*

This bread should more correctly be called cake, for no leaven appears to have been used. The cakes have been met with both round and flat, from one inch to fifteen lines thick, and with a diameter of four or five inches.†

The bread hitherto found has been made of wheat or millet. Barley bread has not been met with; this grain was probably eaten parched or roasted.

B 26.

WEEDS OF THE CORNFIELD.

Tablet 4 *d*.—Seeds of white goosefoot (*Chenopodium album*).—These seeds of weeds appear to have been equally charred with the grains of corn, and probably were mixed with them. One of the most interesting facts connected with this subject is the presence of two weeds of the cornfield, which are not indi-

* Keller, *l.c.*, p.48.

† 'Pre-historic Times,' p. 154.

genous to Switzerland, but were probably imported with the seed corn, the Cretan catchfly (*Silene Cretica*), and the corn blue-bottle (*Centaurea cyanus*); the former is spread over all the countries of the Mediterranean, and is found in the flax-fields of Greece, Italy, the South of France, and the Pyrenees; the original home of the corn blue-bottle is Sicily. The presence of these weeds indicates the way by which corn had come into the hands of the Swiss lake-dwellers.

Upon Plate lxxxvii., Case K 4, will be found representations of the weeds of the cornfield, obtained from the lake-dwellings.

Fig. 30-31.—Cretan catchfly (*Silene Cretica*).
Fig. 32.—Corn-cockle (*Agrostemma githago*).
Fig. 33.—White campion (*Lychnis vespertina*).
Fig. 34.—Sandwort (*Arenaria serpyllifolia*).
Fig. 35.—Goosegrass (*Galium aparine*).
Fig. 36.—Burdock (*Lappa major*).
Fig. 37.—Corn bluebottle (*Centaurea cyanus*).
Fig. 38.—Spurry (*Spergula pentandra*).
Fig. 39.—Creeping crowfoot (*Ranunculus repens*).
Fig. 40.—White goosefoot (*Chenopodium album*).
Fig. 41.—Striped-seeded goosefoot.
Fig. 42.—Darnel (*Lolium temulentum*).

B 26.

Culinary Vegetables.

Tablet 17 (*a*).—Seeds of parsnep (*Pastinaca sativa*).

See Plates lxxxvii. and lxxxviii., Case K 4, for figures of other culinary vegetables found in the pfahlbauten.

Fig. 43.—Parsnep (*P. sativa*).
Figs. 44-47.—Celtic field-bean (*Faba vulgaris Celtica*).
Fig. 48.—Pea (*Pisum sativum*).
Fig. 49.—Lentil (*Ervum lens*).

B 26.

Fruits and Berries.

Tablet 13.—Crab apples (*Pyrus malus*), Robenhausen.

Tablets 14 and 15.—Cultivated apple, larger round lake-dwelling apple (*Pyrus malus cult.*); these have been sliced. Robenhausen.

Tablet 16 (*e*).—Apple pips. Robenhausen.

The carbonised apples found upon the sites of the lake-dwellings, are sometimes whole, but more frequently cut into halves. Large quantities have been found at Robenhausen; 300, or about half a peck, were found together.

Tablet 22 (*c*).—Cherry stones (*Prunus avium*).

Tablet 22 (*a*).—Sloe stones (*Prunus spinosa*).

Tablet 22 (*b*).—Bird cherry stones (*Prunus padus*).

Tablet 23 (*b*).—Bird cherry stones (*P. padus*). Of stone fruit more sloe than cherry stones have been found.

Tablet 16 (*c.*)—Raspberry seeds (*Rubus idæus*).

Tablet 16 (*b*).—Strawberry seeds (*Fragaria vesca*).

Tablet 16 (*d*).—Seeds of the dog rose (*Rosa canina*).

Tablet 16 (*a*).—Seeds of the common elder (*Sambucus nigra*).

See Plate lxxxviii., Case K 4, for figures of other fruits and berries found in the pfahlbauten.

Fig. 50.—Service-tree (*Pyrus aria*).

Fig. 51.—Dog-rose (*Rosa canina*).

Fig. 52.—Elder (*Sambucus nigra*).

Fig. 53.—Dwarf elder (*Sambucus ebulus*).

Fig. 54.—Bilberry (*Vaccinium myrtillus*).

Fig. 55.—Wayfaring tree (*Viburnum lantana*).

B 26.

Nuts.

Tablets 9 to 12.—Hazel-nuts (*Corylus avellana*), Robenhausen and Moosseedorf.

Tablet 17 (*b*).—Beech mast (*Fagus sylvatica*), Robenhausen.

Tablets 20 and 21.—Water-chestnut (*Trapa natans*), Moosseedorf and Robenhausen.

Tablet 21 (*a*).—A recent specimen of *Trapa natans*, from Syracuse, for comparison.

Dr. Heer has suggested that the quantities of beechnuts and acorns which have been met with, were probably intended as food for the swine.

The water-chestnut now only exists in Switzerland, in a tarn in the canton of Lucerne. It doubtless formed an article of food with the ancient lake-dwellers, who appear to have laid up stores of it; it is used for food, at the present day, in Upper Italy.

See Plate lxxxviii., Case K 4, for figures of fruits and berries found in the pfahlbauten.

Figs. 56 to 60.—Hazel nuts (*Corylus avellana*).

Figs. 56 and 57 represent nuts which have been bored by the nut-beetle.

Fig. 60 represents a nut which has been gnawed by a mouse. See specimen on Tablet 9, Case B 26, which has been similarly gnawed.

Fig. 61.—Leaf of nut bush.

Fig. 62.—Beechnut (*Fagus sylvatica*).

Fig. 63.—Covering of the beechnut.

Fig. 64.—Water-chestnut (*Trapa natans*).

B 26.

Oil-producing Plants.

Tablet 17 (*a*).—Seeds of the opium, or garden poppy (*Papaver somniferum* var. *antiquum*), Robenhausen.

(*d*).—Seeds of dogwood (*Cornus sanguinea*), Robenhausen.

Tablet 23 (*b*).—Seeds of dogwood (*C. sanguinea*), Moosseedorf.

Tablet 18 (*a*).—Seeds of henbane (*Hyoscyamus niger*), Robenhausen.

See Plate lxxxviii., Case K 4, for figures of seeds of oil-producing plants found in the pfahlbauten.

Fig. 65.—Young heads or seed vessels of garden or opium poppy.

Fig. 66 (*a*).—A small piece of the poppy cake.

(*b*).—Poppy seed, magnified.

Fig. 67.—Dogwood (*Cornus sanguinea*).

Aromatic Plants.

Caraway seeds have been found in the lake-dwellings, but no specimens are in the Collection.

B 26.

Bast and Fibrous Plants.

Tablet 18 (*b*, *c*, and *d*).—Flax seeds (*Linum angustifolium*), Robenhausen.

The flax of the lake-dwellers is not the common flax. The small-leaved flax (*Linum angustifolium*), which is a native of the countries of the Mediterranean, may be considered as the original stock of the cultivated flax of the lake-dwellers. The presence of the Cretan catchfly proves that the flax-seed came, originally, from Southern Europe.

See Plate lxxxviii., Case K 4, for figures of fibrous plants found in the pfahlbauten.

Figs. 68 to 77.—Lake-dwelling flax (*Linum angustifolium*) Fig. 76 represents a piece of linseed cake found at Robenhausen.

Figs. 78 to 80.—Fruit of the lime tree (*Tilia grandiflora*).

B 26.

PLANTS USED FOR DYEING.

Weld* is the only dye plant mentioned by Dr. Heer as having been found in the lake-dwellings; there is no specimen of it in the Collection; it is figured in Plate lxxxviii., Case K 4.

Fig. 81.—Weld (*Reseda luteola*).

B 26, AND D 20.

FOREST TREES AND SHRUBS.

Case B 26, Tablet 27 (*b*).—Scotch fir cone (*Pinus sylvestris*), Robenhausen.

(*a*).—Mountain pine cone (*P. montana*), Robenhausen.

Case B 26, Tablet 28.—Spruce fir cone (*P. abies*), Robenhausen.

Case B 26, Tablet 30 (*a*).—Spruce fir cone (*P. abies*), Moosseedorf.

Case B 26, Table 26 (*b*).—Spruce fir cone (*P. abies*), Robenhausen.

Case D 20, Tablet 38 (*a*).—Yew wood (*Taxus baccata*), Moosseedorf.

Case B 26, Tablet 26 (*a*).—Yew seeds (*T. baccata*), Robenhausen.

Case D 20, Tablet 36 (*a*).—Oak wood (*Quercus robur*), Moosseedorf.

Case D 20, Tablet 35.—Birch leaves (*Betula alba*), Moosseedorf.

Case D 20, Tablet 36 (*b*).—Ash wood (*Fraxinus excelsior*), Moosseedorf.

Case B 26, Tablet 24 (*c*).—Mistletoe (*Viscum album*), Moosseedorf.

See Plate lxxxviii., Case K 4, for figures of cones, &c., of trees and shrubs found in the pfahlbauten.

Fig. 82.—Scotch fir (*Pinus sylvestris*).

Fig. 83.—Mountain pine (*P. montana*).

Fig. 84.—Silver fir (*P. picea*).

Fig. 85.—Juniper (*Juniperus communis*).

Fig. 86.—Yew (*Taxus baccata*).

* Withering calls Weld, 'Wild Woad,' or 'Dyer's Weed.'

Fig. 87 to 90.—Oak (*Quercus robur*).
Fig. 91.—Hornbeam (*Carpinus betulus*).
Fig. 92.—Mistletoe (*Viscum album*).

B 26.

MOSSES.

Tablet 30 (*b*).—(*Anomodon viticulosus*), Moosseedorf.
Tablet 29.—(*Neckera crispa*), Moosseedorf.

B 26.

PLANTS FOR PROCURING FIRE.

Tablet 25.—Common tinder fungus (*Polyporus igniarius*), Robenhausen.

The Iroquois use a fungus which grows on the maple, as *punk* in kindling fire; another kind which is found on the birch is used when the former cannot be obtained. These substances will smoulder, but not burst into flame; they are therefore wrapped in cedar bark which has been pulled by hand to separate the fibres, in which state it readily ignites.

B 26.

WATER AND MARSH PLANTS.

Tabiet 31 (*e*).—Seeds of Chara (*Chara vulgaris*), Robenhausen.

Tablet 32 (*e*).—Seeds of Lake scirpus (*Scirpus lacustris*), Robenhausen.

Tablet 31 (*a*).—Seeds of Marsh Scheuchzeria (*Scheuchzeria palustris*), Robenhausen.

Tablet 31 (*b*).—Seeds of Yellow flag (*Iris pseudacorus*), Robenhausen.

Tablet 32 (*b*).—Seeds of Pondweed (*Potamogeton perfoliatus*), Robenhausen.

Tablet 32 (*a*).—Seeds of Pondweed (*P. compressus*), Robenhausen.

Tablet 32 (*c*).—Seeds of Common hornwort (*Ceratophyllum demersum*), Robenhausen.

Tablet 31 (*c*).—Seeds of Buckbean (*Menyanthes trifoliata*). Robenhausen.

Tablet 31 (*f*).—Seeds of Marsh bedstraw (*Galium palustre*), Robenhausen.

Tablet 32 (*g*).—Seeds of Marsh lousewort (*Pedicularis palustris*), Robenhausen.

Tablet 31 (*a*).—Seeds of White water-lily (*Nymphœa alba*), Robenhausen.

Tablet 32 (*a*).—Seeds of Yellow water-lily (*Nuphar luteum*), Robenhausen.

Tablet 23 (*b*).—Seeds of Yellow water-lily (*N. luteum*), Moosseedorf.

Tablet 32 (*f*).—Seeds of Water crowfoot (*Ranunculus aquatilis*), Robenhausen.

The character of the water and marsh plants shows that, at least at Robenhausen, the lake-dwellings were not erected over the deep and clear water of the lake, but on muddy shallows overgrown with vegetation.

See Plate lxxxviii, Case K 4, for figures of seeds of other water and marsh plants found in the pfhalbauten.

Fig. 93.—Lake scirpus (*Scirpus lacustris*).
Fig. 94.—Pondweed (*Potamogeton perfoliatus*).
Fig. 95.—Pondweed (*P. compressus*).
Fig. 96.—Common hornwort (*Ceratophyllum demersum*).
Fig. 97.—Marsh bed-straw (*Galium palustre*).
Fig. 98.—Marsh bed-straw, very much magnified.
Fig. 99.—Buckbean (*Menyanthes trifoliata*).
Fig. 100.—Marsh lousewort (*Pedicularis palustris*).
Fig. 101.—Yellow water-lily (*Nuphar luteum*).
Fig. 102.—Small yellow water-lily (*N. pumilum*).
Fig. 103-104.—White water-lily (*Nymphœa alba öocarpa*).
Fig. 105.—Marsh Scheuchzeria (*Scheuchzeria palustris*).
Fig. 106.—Lesser spearwort (*Ranunculus flammula*).
Fig. 107.—Ivy-leaved crowfoot (*R. hederaceus*).
Fig. 108.—Marsh pennywort (*Hydrocotyle vulgaris*).

The lake-dwellings were probably inhabited during the whole year, as the undigested remains of food appear to prove. The cherry-stones indicate June; the seeds of raspberries and blackberries the middle and end of summer; the sloes and the seeds of the dog-rose the latter part of autumn; and the hazel nuts and beech nuts refer to the autumn and winter. The presence of remains of the swan, a bird which only appears in the Swiss lake district during very cold winters, in the months of December and January, proves that the lake-dwellings were not abandoned even in the most severe winter weather.

B 27.

In this Case flint implements and worked flints are exhibited. It has been mentioned at page 143 that the flint used by the lake-dwellers was probably obtained by barter. This is quite in accordance with what is known to be the practice of

modern savages. In Australia, the special products of each district, pipe-clay and red ochre, drinking cups and cockatoo's feathers, and especially 'a much-esteemed kind of flint from the North'* are conveyed by barter from tribe to tribe on the vast continent.†

The presence of flint on the shores of the western arm of the Lake of Constance (Ueberlinger See), led to the discovery of lake-settlements in the neighbourhood. The inhabitants had been accustomed, from time immemorial, to draw their supplies of flint exclusively from the shores of the lake. Herr Ullersberger was led to consider that this great abundance of flint, in a district where it does not occur naturally, could be explained only by the supposition that the whole of the material had been taken there by man. Acting upon this conviction, he carefully examined the available localities on the shores of the Ueberlinger See, in the winter of 1862-3, and discovered the remains of five lake-settlements, two of which, Nussdorf and Maurach, are of the Stone period; the other three belong to the Bronze period.

Tablets 1 to 6.—Flint, worked and unworked, Moosseedorf.

Tablet 7.—Flint implements, Moosseedorf.

Tablet 8.—Flint scrapers, Moosseedorf.

A number of flint implements from Nussdorf have been figured by Mr. Lee, one of which (No. 13) appears to be a scraper.‡ Flint scrapers, from Concise, have been figured.§

Tablet 9.—Casts of flint arrow-heads, Moosseedorf. The originals are in the collection of Dr. Uhlmann.

Tablet 10.—Flint arrow-heads, Moosseedorf.

Tablets 11 to 13.—Flint, worked and unworked, Robenhausen.

Tablet 14.—Flint arrow-heads, Robenhausen.

Tablet 15.—Flint saw, in its original wooden handle fastened with asphalt, Robenhausen.

A flint saw, set in a handle of yew wood with asphalt, found at Meilen, has been figured by Mr. Lee,‖ as well as another, from Wangen, mounted in stag's horn.¶ Two flint saws found at Nussdorf have also been figured.** Six other specimens

* A. J. Oldfield, 'The Aborigines of Australia,' in 'Trans. of the Ethno. Soc.,' vol. iii., 1865, p. 269.

† 'Quarterly Review,' No. 250, Oct. 1868, p. 432.

‡ Keller, *l.c.*, plate xxvii., figs. 10, 12 to 14 and 20.

§ Troyon, 'Habitations Lacustres,' plate v., fig. 12 and 18.

‖ Keller, *l.c.*, plate iii., fig. 1.

¶ Keller, *l.c.*, plate xxi, fig. 10.

** Keller, *l.c.*, plate xxviii., fig. 9 and 10.

appear to have been obtained from Nussdorf; the handles are of yew wood, of the shape of a weaver's shuttle, and in some of them there is a drilled hole at one end as if for suspension. A flint saw in a handle of fir-wood, found at Moosseedorf, has been figured,* as well as a specimen found at Wangen,† and another found at Concise.‡ In Mr. John Evans's splendid collection at Nash Mills there is a flint saw mounted in a handle of yew wood, found at Nussdorf.

The asphalt used by the lake-dwellers was probably obtained at Val Travers (Canton of Neuchâtel), in Alsace, or at Seyssel, near the "Perte du Rhone."

A small drinking cup made of asphalt has been found at Robenhausen. Asphalt also served for mending broken pottery. Not only were stone hatchets fastened to their handles, and flint arrow-heads attached to their shafts with this substance by the lake-dwellers, but it has also been used by them as a material for handles. A bone awl with a handle made entirely of asphalt has been found at Moosseedorf.§ In the Museum of Practical Geology, Jermyn Street, there is a chipped stone hatchet, merely rubbed at the cutting edge; the butt end is covered with gum, obtained from the grass tree, in order to render it smooth for use in the hand. This highly interesting specimen was found in the interior of Australia, and was presented by Mr. Thomas Middleton.

A lump of asphalt was found at Wauwyl; this may be regarded as raw material taken there for future use. ‖

Tablet 16.—Stone chisels, Robenhausen.

Tablets 17 and 18.—Flint flakes and implements, Wangen.

Tablet 19.—Flint implements, Wangen.

Tablet 19 (*b*).—Flint boring-tool worn towards the point, Wangen.

Tablet 20.—Flint arrow-heads, Wangen.

Flint implements of all kinds are rare at Wangen, probably from the scarcity of the raw material. All the flint arrow-heads in the Collection from Wangen are of the triangular type. The only flint arrow-head from Wangen, which Mr. Lee figures,¶ is also of this type; it is nicely serrated at the edges.

* Keller, *l.c.*, plate v., fig. 5.

† Troyon, 'Habitations Lacustres,' plate v., fig. ii.

‡ Desor, 'Les Palafittes,' fig. 12. The handle in this instance is of stag's horn.

§ Keller, *l.c.*, p. 54, p. 34, plate xiv., fig. 21.

‖ Keller, *l.c.*, plate xx., fig. 8.

¶ Keller, *l.c.*, plate xiv., fig. 10, 11.

Flint arrow-heads of the usual types, however, are found at other stations. Mr. Lee has figured stemmed flint arrow-heads, which were found at Robenhausen,* Concise,† Nussdorf,‡ Zug,§ Estavayer,‖ and Montellier.¶ The circumstance that some of these stations do not belong to the Stone period, *merely* tends to confirm the belief that flint continued in use for some purposes long after the introduction of metal.**

Lozenge-shaped flint spear and arrow-heads, found at Concise, have been figured.†† A lozenge-shaped spear-head has been figured from Auvernier.‡‡ Triangular flint arrow-heads have been figured from Nussdorf§§ and Concise.‖‖

In the Nash Mills Collection there are examples of triangular flint arrow-heads from Nussdorf and Concise, and of stemmed flint arrow-heads from Concise.

In Dr. Clément's collection¶¶ at the Paris Exhibition, 1867, were some bone and flint arrow-heads retaining portions of the bitumen by which they had been attached to the shafts.

A triangular flint arrow-head and a stemmed flint arrow-head, with the original wooden shafts, were shown by Dr. Clément. Each specimen was about 11 inches long, although neither were perfect; they were both obtained from St. Aubin (Lake of Neuchâtel). Triangular, stemmed, and leaf-shaped flint arrow-heads were exhibited in the Clément collection; a beautifully-chipped, stemmed flint arrow-head, about 5 inches long, was shown from St. Aubin, as well as a stemmed arrow-

* Keller, *l.c.*, plate xiii., fig. 13.

† Keller, *l.c.*, plate liv., fig. 7 and 8. Stemmed flint arrow-heads, from Concise, are figured in Troyon's 'Habitations Lacustres,' plate v., fig. 7—9; see also Desor's 'Les Palafittes,' fig. 4, 5, 6.

Keller, *l.c.*, plate xxvi., figs. c to e. At Nussdorf nearly 100 flint arrow and spear-heads were found, as well as about 80 flint saws, piercers, and knives.

§ Keller, *l.c.*, plate xxi., fig. 4.

‖ Keller, *l.c.*, plate xlviii., fig. 25.

¶ Keller, *l.c.*, plate lii., A, fig. 6. No. 7 in the same plate is a barbed bronze arrow-head, also found at Montellier; they are both in the collection of Colonel Schwab, at Bienne.

** Page 38, 112.

†† Keller, *l.c.*, plate lv., fig. 16. Troyon, 'Habitations Lacustres,' plate v., fig. 5, 6, and 16.

‡‡ Keller, *l.c.*, plate xlvii., fig. 23.

§§ Keller, *l.c.*, plate xxvi., fig. a and b.

‖‖ Keller, *l.c.*, plate liv., fig. 9. Troyon, 'Habitations Lacustres,' plate v., fig. 3, 4.

¶¶ The "Clément Collection" has been purchased by the Trustees of the Peabody Museum of American Archæology and Ethnology, Cambridge, Massachusetts.

head of hyaline quartz about an inch in length. A bow of yew wood, about 24 inches long, was exhibited from Robenhausen. A bow of yew wood, measuring five feet round the curve, has been found at this station.*

A triangular flint arrow-head, attached to its original wooden shaft, and mounted precisely like those from the lake-dwellings, was found in 1843, upon the mainland, on the Zug mountain, in what is known as the Moor of Geissboden.†

Tablet 21.—Flint implements, Bodensee.

Tablet 22.—Portion of a wooden implement, the point of which has been hardened by fire, Wangen.

Tablet 23.—Twisted cord of woody fibre, Moosseedorf.

Hanks of string have been found at Robenhausen.‡

Tablet 24 (*b* to *h*).—Canine teeth of dogs, drilled for suspension.

Tablet 24 (*a*).—Canine tooth of bear, similarly drilled.

A drilled canine tooth of a bear has been figured from Meilen.§ Another specimen, found at Nussdorf, has also been figured;‖ as well as one drilled, and one grooved for suspension; both of these were found at Concise.¶

In Case E 4, No. 28, is some Esquimaux fishing-tackle, perhaps used as a fish-lure; the place of the hook is occupied by the drilled canine tooth of a bear with drilled canine teeth of dogs suspended around it. If this was used, as suggested, for a lure, the motion of the smaller teeth would have attracted the fish, which may have been speared through a hole in the ice. Before deciding that these drilled teeth from the pfahlbauten have served merely as ornaments or amulets, it may be well to consider their possible application to other purposes. That the drilled canine teeth of animals are, and have been used for ornaments is well known. No. 21, in Case D 5, is a modern necklace made of canines of the jaguar from Ecuador, South America. Many of the drilled teeth from the mounds of Ohio, in Case B 34, were probably worn as ornaments.

Dr. Keller remarks that the fishermen think these drilled teeth of bears from the pfahlbauten were used for making fishing nets.**

Tusks of the boar were also turned to account by the lake-

* Keller, *l.c.*, plate x., fig. 10.

† Keller, *l.c.*, pp. 124—125, plate xxxix., fig. 15.

‡ Keller, *l.c.*, plate xiv., figs. 2 and 6.

§ Keller, *l.c.*, plate iii., fig. 6.

‖ Keller. *l.c.*, plate xxviii., fig. 15.

¶ Troyon, 'Habitations Lacustres,' plate vi., fig. 12 and 18.

** Keller, *l.c.*, p. 27.

dwellers. They were used whole or split in two, and were ground sharp at one end, so that the enamel of the tooth formed the edge of the tool. These specimens very much resemble shoemakers' knives, and may have been used for cutting skins. About half-a-dozen specimens have been obtained from Meilen; some of them were perforated at one end.

A pig's tooth mounted as a chisel in a handle of stag's horn, the complete tool being about four inches in length, was shown by Dr. Clément at the Paris Exhibition, 1867; it was found at St. Aubin. Another pig's tooth chisel, about six inches long, including the stag's horn handle, was shown from Concise.

A similar chisel has been figured from this station,* as well as an incisor of some ruminant (ox?) mounted as a chisel in a stag's horn handle,† and a *bone* chisel mounted in a handle of stag's horn.‡

Implements and tools made of boars' tusks have been figured from Moosseedorf,§ Wauwyl,‖ Concise,¶ and Meilen.**

B 27.

Upon Tablets 25 and 26 are fæces of goats, sheep, &c., from Robenhausen.

The cattle, their stalls, and winter stores were not kept on land, as was formerly supposed, but on the lake-platforms themselves. Although this statement is based only on the observations made at Robenhausen, there cannot be the slightest doubt that the manner of life was the same in the other lake-settlements.††

Herr Messikomer has discovered in the peat of Robenhausen, horizontal beds from two to ten inches thick, composed entirely of the excrements of cows, pigs, sheep, and goats, together with the remains of the litter they had used.‡‡ The litter for the cows consisted chiefly of straw and rushes; that for the smaller animals was of sprigs of fir and twigs of brushwood.§§

At Wangen some straw was found arranged in such a parallel

* Troyon, 'Habitations Lacustres,' plate vi., fig. 13.
† Troyon, *l.c.*, plate vi., fig. 14.
‡ Troyon, *l.c.*, plate vi., fig. 15.
§ Keller, *l.c.*, plate xiv., fig. 12, plate xxii., fig. 5, plate v., fig. 6, 7, and 15.
‖ Keller, *l.c.*, plate xx., fig. 16.
¶ Keller, *l.c.*, plate liv., fig. 11.
** Keller, *l.c.*, plate iii., fig. 10, 11.
†† Keller, *l.c.*, p. 57.
‡‡ Keller, *l.c.*, p. 46.
§§ Keller, *l.c.*, p. 47.

manner as to induce the belief that it had formed part of the thatch of one of the huts.*

Tablets 27 and 28.—Spindle-whorls of clay. † Bodensee.

Tablets 29 and 30.—Spindle-whorls of clay. Wangen.

The stone "spindle-whorls" from Concise, figured in Keller's "Lake Dwellings," are of such irregular forms as to preclude the idea of their use as fly-wheels; ‡ it is probable that they were "net sinkers," or stone weights used for fishing with a line. § Oval "spindle-whorls" with two perforations have been found by Dr. Keller and M. Louis Rochat; ‖ these may have been buttons. A similar specimen found at Concise has been figured. ¶

Tablet 31.—Hæmatite, probably used for paint. Robenhausen.

It is well known that if a lump of hæmatite be rubbed with water a red pigment is produced; this mode of preparing red paint is still practised by the aborigines of North America and other countries. The specimens in the Collection, hereafter to be described, appear to show that this ore of iron was long since applied to this purpose by the mound-builders of Ohio. It is thought that the ancient cave-dwellers of France obtained paint from hæmatite.** No doubt, when a ferruginous clay could be readily obtained, it would be used with grease for colouring the person, as with the Andamanese,†† because trouble would be saved,—a great desideratum with the savage. We may also suppose that clubs, shields, and many other things were coloured by prehistoric races as they are by some modern savages.

Tablet 32.—Wooden float for a fishing line or net. Robenhausen.

Similar fishing-floats are figured by Mr. Lee from Wauwyl,‡‡ and from Robenhausen.§§ These objects are of various sizes, and are found in great abundance; they are frequently made of the bark of the fir-tree.

* Keller, *l.c*, plate xxi., fig. 13.

† See page 94.

‡ Plate liv., fig. 4 and 5. Stone spindle-whorls of circular shape found at Concise, are figured in Troyon's 'Habitations Lacustres,' plate viii., fig. 9 and 11.

§ See page 95.

‖ Keller, *l.c.*, p. 173.

¶ Troyon, *l.c.*, plate viii., fig. 8.

** See p. 52.

†† Admiral Belcher, 'Notes on the Andaman Islands,' 'Trans. Ethno. Soc.,' vol. v., p. 40.

‡‡ Keller, *l.c.*, plate xx., fig. 14.

§§ Keller, *l.c.*, plate xi., fig. 5.

B 28.

Tablets 1 and 5.—Portions of fishing nets. Robenhausen.

Although no examples are in the Collection, stone "net-sinkers"* have been met with in the lake-settlements. These objects are rather flat rolled stones, showing no workmanship, with the exception of a slight hollow band worked round the middle. Similar net-sinkers, in recent use near Ambleside, can be seen in Case E 4, Nos. 29 to 30. Some net sinkers found at Allensbach, Untersee, have been figured.† A specimen from Steinberg has also been figured;‡ its use as a flail-stone or for arming a club was suggested by M. Troyon.

Even during the Iron period the Swiss lake-dwellers used stone net-sinkers; one was found at Nidau with an iron ring passed around the central groove, and with a loop left in the iron by which it could be attached to the net. There can be no doubt that durability was the object in thus substituting an iron band for one of cord. Some of the largest net-sinkers (anchors?) found at Nidau weigh five or six pounds. Other net-sinkers of smaller size were perforated; specimens of the perforated variety, found at Concise, have been figured.§

Tablet 6.—Hanks of spun flax. Robenhausen.

Tablets 2 to 4 }
Tablets 7 to 16 } Specimens of weaving and platting.‖

Tablets 17 to 20.—Pointed bone tools and chisels. Moosseedorf.

* Pages 94—96.

† Keller, *l.c.*, plate xxiv., fig. 1 and 4.

‡ 'Habitations Lacustres,' plate xii., fig. 38, pp. 157, 472.

§ Keller, *l.c.*, plate liv., fig. 3 and 5.

‖ It will be observed that all these textile fabrics have been burnt, and a doubt may arise on the part of the visitor whether, in the event of a conflagration, these cloths would have preserved their texture so completely, and have settled down upon the lake-bottom to be covered with silt or peat, there to remain uninjured, until disturbed by restless fingers many centuries later. Mr. Lee, however, has brought the matter to a practical test. I give the account in his own words. His letter is dated 26th April, 1869:—"I took an iron bucket, containing mud and water. The top of the bucket was crossed with slight sticks, upon which I piled chips and wood shavings, mixed with cloth of various kinds. Having set fire to this it burnt rapidly, and the ashes fell into the mud and water. I floated off the burnt cloth, as naturalists do sea-weed—dried and mounted the specimens between glass, and they perfectly resemble, in point of condition, the carbonised textiles from the Swiss lake-dwellings." The specimens 16 *a* are some of these; they have been presented to the Collection by Mr. Lee. "When exposed to the air in burning a white ash results, and the texture is destroyed; but when the cloth is burnt *in* charcoal the texture is beautifully preserved."—E. T. S.

Tablets 21 to 23.—Pointed bone tools and chisels. Robenhausen.

Upon Tablet 23 is a small bone implement pointed at both ends. Robenhausen.

Mr. Lee gives figures of two similar implements of bone pointed at both ends, found at Wangen.* One of these is exactly like the specimen exhibited; the other, however, is grooved round the middle where the line would have been attached. This kind of bone implement no doubt was used in fishing: it was completely covered by the bait, and when swallowed it could not easily have been got rid of by the fish. Ducks are caught on the Untersee at the present time with similar implements.† Indeed the pointed bone acts like the needle we use in "sniggling" eels; a very similar contrivance for fishing is employed by the aborigines of Australia.

B 29.

Tablet 20.—Pointed bone tools and chisels. Robenhausen.

Tablets 21 to 30.—Pointed bone tools and chisels. Wangen.

Tablets 31 and 32.—Pointed bone tools and chisels. Concise. Presented by the late M. Troyon.

Some of the pointed bone tools, such as those on Tablet 23, are made from ribs split and worked to a point at one end; perhaps these were used in netting or in the manufacture of pottery.‡

Combs made both of wood and stag's horn have been found in the lake-dwellings. Three made of stag's horn were obtained at Nussdorf.§ A comb of yew wood, found at Moosseedorf, has been figured.‖

Mr. Lee has alluded to a resemblance between these combs and that found, above the stalagmite, in Kent's Cavern near Torquay.¶ The combs from the lake-dwellings, however, are broader and shorter than the Kent's Cavern specimen, which is like other combs found in England and Scotland, as already mentioned.**

The Esquimaux women (Greenland) use bone combs, very like those found in the lake-dwellings, when plaiting sinew

* Keller, *l.c.*, p. 67.
† Keller, *l.c.*, p. 67.
‡ 'Prehistoric Times,' p. 135.
§ Keller, *l.c.*, plate xxviii., fig. 8.
‖ Keller, *l.c.*, plate v., fig. 21.
¶ Keller, *l.c.* note, p. 114.
** Pages 64 and 65.

cord, to clear the tangled lower part. One of these Greenland combs may be seen in the Christy Collection.

No examples of the heads of weapons made either of bone or of stag's horn are in the Collection. Some interesting specimens of these objects were in the Paris Exhibition, 1867. Among them was a harpoon-point with a single barb, made of stag's horn, above five inches long; another weapon-point about four-and-a-half inches long, made also of stag's horn, was of a sugar-loaf form, socketed, with a drilled hole to admit a pin for fastening it to the shaft; it had a projection on one side, at the base, perhaps in order that it might be further secured by binding. A similar specimen, referable to the Bronze period, was found at Cortaillod,* and a bronze spear-head having the same kind of projection at the base, found at Estavayer, is in the collection of Colonel Schwab at Bienne.†

Bone arrow-heads have been found at Concise,‡ some of these have a single barb; § a bone arrowhead from Concise is in the Museum at Neuchâtel; it has been figured by Professor Desor; ‖ a bone spear-head has also been figured, which was found at Concise.¶

No. 9, H 8, is the model of a harpoon with a barbed point of stag's horn; the original is in the collection of Dr. Uhlmann.

Barbed harpoon points of stag's horn have been found at Concise** and at Wauwyl.†† A lance-head of bone, found at Moosseedorf, has been figured.‡‡

H 8.

No. 6.—Model of a stone chisel, in its handle of stag's horn. The original is in the collection of Dr. Uhlmann, who obtained it from Moosseedorf.

No. 7.—Model of a stone hatchet, with its handle complete. The original is in the collection of Dr. Uhlmann, who obtained it from Moosseedorf.

* Keller, *l.c.*, plate xlv., fig. 5.

† Keller, *l.c.*, plate l., fig. 2.

‡ Troyon, 'Habitations Lacustres,' plate vi., fig. 1—9. Keller, *l.c.*, plate liv., fig. 12—17.

§ Troyon, *l.c.*, plate vi., fig. 4, 5.

‖ 'Les Palafittes,' fig. 7.

¶ Troyon, *l.c.*, plate vi., fig. 12.

** Troyon, *l.c.*, plate vi., fig. 25 and 32.

†† Keller, *l.c.*, plate xx., fig. 26.

‡‡ Keller, *l.c.*, plate v., fig. 4.

No. 8.—Model of a stone hatchet, in its handle complete, from Concise. The original formed part of the collection of the late M. Troyon.

No. 9.—Model of a harpoon, with a barbed head of stag's horn. The original handle was 12 feet long, it was obtained from Moosseedorf, and is in the collection of Dr. Uhlmann.

No. 10.—Cast of a portion of the platform of a pile-dwelling at Concise. Cast taken by the late M. Troyon.

C 19.

No. 1.—Scapula of ox, Robenhausen. This has been worked, and used as an implement.

Nos. 2 to 9.—Pieces of stag's horn, which, having been cut partly through, were then broken off by a blow. Robenhausen.

Nos. 11 and 12.—Perforated clay balls (loom weights).* Wangen.

No. 13.—Perforated conical loom weight. Robenhausen.

No. 14.—Hearth-stone. Robenhausen.

No. 15.—Hearth-stone. Wangen.

C 20.

Nos. 1 to 6.—Pieces of stag's horn, cut like specimens in C. 19.

Nos. 7 to 10, 12.—Stone corn-crushers. Moosseedorf, Robenhausen and Wangen.

No. 13.—Stone hammer. Moosseedorf.

No 11.—Hearth-stone. Robenhausen.

C 21.

Nos. 1 to 6.—Pieces of stag's horn, cut like specimens in C 19 and 20.

* Since the notice of "loom weights," at p. 67, was printed, a chalk loom weight has been presented to the Collection by the Rev. D. M. Clerk, of Kingston Deverill. It is shown in Case D 11, No. 50. Mr. Clerk informs me (May 3rd, 1869) that this specimen was found, with fourteen others like it, about the year 1855, in quarrying for flints, on the hill just above Kingston Deverill, near Warminster, Wilts. The fifteen specimens were placed in regular order, forming about three parts of a circle, around a heap of greasy black earth. An iron implement (I am at present without information of what form) was found with these loom weights. The loom weights were all in a slanting direction (not upright), with the small ends inwards, declining at a considerable angle, and with the holes, without exception, "up and down."—E. T. S.

Nos. 2, 3, 4, 5, and 6 have not been cut like the other specimens, but have been sawn.

Nos. 7 and 8, 10 to 14.—Stone corn-crushers. Wangen.

No. 9.—Hearth-stone. Wangen.

The stones used by the lake-dwellers as corn-crushers are of a spherical form, some flattened on two sides like an orange; others almost round, with depressions on the four opposite sides.* They are about the size of a man's fist, or rather less, and usually show traces of wear. The Swiss lake-dwellers appear to have bruised their corn much in the same way that the natives of Africa do now. The lower stone of the African mill consists of a block of granite, syenite, or even mica-schist, fifteen or eighteen inches square, and five or six thick; the upper millstone is a piece of quartz or other hard rock about the size of a half brick, one side of which has a convex surface, which fits into a concave hollow in the large and stationary stone. The workwoman kneeling grasps the upper millstone with both hands, and works it backwards and forwards in the hollow of the lower millstone, as a baker works his dough by pressing it and pushing it from him. The weight of the person is brought to bear on the movable stone, and while it is pressed and pushed forwards and backwards, one hand supplies every now and then a little grain to be bruised and ground on the lower stone, which is placed in a sloping position, so that the meal falls upon a skin or mat spread to receive it. This is, probably, the most primitive form of mill, and anterior to that in use in Oriental countries and elsewhere, where two women grind at one mill.†

A stone in recent use for grinding grain in New South Wales is exhibited upon the top of the Case H 8, No. 1. H 7, Nos. 3 and 4 are modern stone hand-mills from Teneriffe. No. 3 is new; No. 4 has been much used, nearly half of both stones have been worn away. Some person or persons, by this wearing in the trituration, must have swallowed about half of these millstones.‡ An Arab hand-mill from the Soudan, similar to the Teneriffe specimens, is in the Christy Collection. For ancient examples, see mealing stones from the West Indies, Case C 28,

* Troyon, 'Habitations Lacustres,' plate viii., fig. 43, found at Morges.

† 'Narrative of an Expedition to the Zambesi and its Tributaries,' by David and Charles Livingstone. London, 1865. Dr. Keller remarks that the drawings of African corncrushers at pages 543 and 544 are identical with the corncrushers from the lake-dwellings. Keller, *l.c.*, pp. 25-26. See notice of querns, pp. 62—64.

‡ Page 62.

Nos. 1 to 11; from California, H 12, Nos. 1 to 9; from Chiriqui, C 32, Nos. 1 to 4; from Salisbury, H 6, Nos. 1 to 3, and 7 to 9; from Ireland H 7, Nos. 1 and 2. Modern stone pestles for pounding grain, from Marquesas, are shown, H 11, Nos. 12 and 14; for pounding meat (pemican), from the north-west coast of America, H 11, No. 13.

A 34, B 29, AND C 22.

FLINT IMPLEMENTS FROM ITALY.

C 22.

Upon tablets 6 to 11 are waste flakes and rude flint implements from a drift deposit at Ponte Molle, about two miles from Rome.* These specimens were found and presented to the Collection by the late Rev. R. S. C. Chermside. Sig. Pigorini, in a letter dated 17th Feb., 1866, mentions the discovery of flint implements in this deposit, at Ponte Molle.* Professor Ponzi has also written a paper upon the same subject, in which are 14 figures of worked flints found in the drift at Ponte Molle, as well as figures of three flint arrow-heads obtained from the surface soil, and referable to the neolithic period.† The discovery of worked flints in the drift, at Ponte Mammolo, by Sig. Ceselli, in 1846, has been already mentioned.‡ Fourteen specimens obtained from Ponte Mammolo, Monte Sacro, Torre di Quinto, and Acqua traversa have been figured.§ With these specimens remains of *Hyæna spelæa*, Hippopotamus, and molars of elephants, referred by Sig. Ceselli to *E. antiquus*, *E. meridionalis*, and *E. primigenius*, were found associated.‖ A fine series of worked flints belonging to Sig. Ceselli, and obtained by him from the drift at Ponte Molle, was exhibited to the members of the Archæological Institute of Prussia, on the 23rd March, 1866, by Sig. Pigorini. These specimens were used to illustrate Sig. Pigorini's paper upon the prehistoric antiquities found in the Campagna

* 'Matériaux', *l.c.*, vol. ii., p. 277.

† 'Sugl' istromenti in pietra focaia rinvenuti nelle cave di breccie presso Roma riferibili all industria primitiva' in the 'Atti dell' Accad. pontificia dei Nuovi Lincei' 8th March, 1866.

‡ Page 39.

§ Luigi Ceselli, 'Stromenti in silice della prima epoca della pietra della Campagna Romana,' Roma, 1866.

‖ Ceselli, *l.c.*, 'Matériaux,' *l.c.*, vol. iii., pp. 131-132.

of Rome.* Some flint implements approaching the drift types were sent to the Paris Exhibition, 1867, from the Museum of Imola.

It is doubtful whether the Italian drift implements should be regarded as of equal age with the implements of the Somme valley, and those of Wiltshire, Hampshire, and Norfolk.

A 34.

No. 2 is a stemmed flint arrow-head, found at Cervetri, the ancient Cære, near Rome; it was presented to the collection by the late Rev. R. S. C. Chermside.

A very fine stemmed flint spear-head, about three and three quarter inches long, was sent to the Paris Exhibition from the Museum at Naples. It was found in the province of Civitanuova. Semicircular supports were left to the barbs of this specimen. Stemmed flint arrow-heads, found in Italy, are preserved in the Museum at Sigmaringen; some of these have been figured. †

A flint blade, about eleven inches in length, is preserved in the British Museum. It was found near Pæstum, and formed part of the Hamilton Collection. ‡ In the British Museum there is also a highly-polished stone hatchet, found in Italy (Payne Knight Coll.), as well as a stemmed flint arrow-head, presented by Mr. Edward Waterton, which was found on the Campagna, near Rome. In the Christy Museum, a stone hatchet and a quartzite flake are exhibited from Italy. Stone hatchets found in Italy, are to be seen in the Museums at Parma, Bologna, and Piacenza. Drilled stone axes found in Italy are shown in the two last-mentioned collections. §

An especial interest is attached to the discovery of stone implements in Italy, as the use of metals was certainly known in that country at a very early period. ‖

* 'Matériaux,' *l.c.*, vol. ii., pp. 305-306.

† Lindenschmit, 'Die Alterthümer unserer heidnischen Vorzeit,' heft vi., taf. 1, n. 7. 8, 12.

‡ Horæ Ferales,' plate ii., fig. 32.

§ Gastaldi, *l.c.*, p. 127.

‖ Information upon the Stone period of Italy is given in the following papers:—

Ponzi 'Sui manufatti in focaia rinvenuti all' Inviolatella nella Campagna Romana e sull' uomo all' epoca della pietra.' Rome, 1867, in the 'Atti. Accad. de' Nuovi Lincei,' vol. xx., 2 Dec., 1866. Secci, 'Sur la découverte d'outils en pierre de silex près Monticelli,' Rome, 1866. 'Correspondance de Rome,' May 4th and June 8th, 1867. G. Nicolucci, 'Antichita dell' uomo nell' Italia centrale, nota,' republished from 'Rendiconto Accad. Sci. fisiche e nat.

B 29.

In this Case casts of stone hatchets and implements, found in Italy, are exhibited.

Upon Tablet 1 are casts of stone hatchets from Nice.

Between Finale Marina and Nice there is a series of caves, in which worked flints, associated with charcoal, have been found. In sinking some wells at his château, at Nice, Sig. Perez found several stone hatchets, spindle-whorls, and bone piercing tools. Stone hatchets are tolerably abundant in the Valley of Esteron; in the neighbourhood of Torretta, Giletta, Tadone, and Pierre-a-feu.*

Upon Tablet 3 is the cast of a stone hatchet from Piedmont.

A hatchet of saussurite, of very fine workmanship, has been mentioned by Sig. Gastaldi as having been found in the Ligurian Apennine, in a ravine, of the territory of Belforte, district of Ovado, Piedmont.†

Sig. Forel discovered flint arrow-heads and hatchets in some caves, near Mentone.‡

Flint flakes and arrow-heads have been found by Professor Capellini on the promontories of the Gulf of Spezia.

The Marquis Carlo Strozzi has met with objects of the Stone period in various caves in Tuscany. In the Cave of the Saints, at Monte Argentario, he found arrow-heads of a variety of flint not occurring naturally in the neighbourhood. In a cave near Monte Tignoso, the Marquis Strozzi met with flint arrow-heads, leaf-shaped flint spear-heads, and a hatchet of diorite.§

Upon Tablet 2 *b* is the cast of a stone hatchet from Tanaro.

Stone hatchets have been found upon hills of Langhe, on the

Napoli,' 1st August, 1868. Bleicher, 'Essai d'une monographie géologique du Mont Sacré, quelques mots sur l'ancienneté de l'homme dans la vallée de l'Anio,' republished from 'Mém. Soc. Colmar.' 1865. G. Nicolucci, 'Di alcune armi ed utensili in pietra rinvenuti nelle provincie meridionali dell' Italia e delle popolazioni ne' tempi antestorici della Peninsola Italiana,' Naples, 1863, republished from 'Atti R. Accad. Sci. fisiche e nat.,' 10th Feb., 1863, vol. i., No. 10. Ponzi, 'Sulle tombe preistoriche rinvenute presso Cantalupo Mandela, sulla via Valeria,' in the 'Atti Accad. pontificia dei Nuovi Lincei,' 10th March, 1867. 'Matériaux,' *l.c.*, vol. iv., pp. 342-344.

* Gastaldi, 'Lake-Habitations of Northern and Central Italy,' translated by Charles Harcourt Chambers, and published by the Anthropological Society of London, pp. 40, 41.

† Gastaldi, *l.c.*, p. 97.

Notice sur les instruments en silex et les ossements trouvés dans les cavernes de Menton.'

§ Gastaldi, *l.c.*, pp. 4, 5.

right of the Tanaro; as well as on the Apennine of Piacenza, at Pessola, Bardi, Corviglio, Pellegrino, Gravago, Solignano, Campello, and Vargi.*

Upon Tablet 14 is the cast of a hatchet of green porphyry, found at Ceresara, near Guidizzolo. The original has been figured.†

Upon Tablet 15 is the cast of a drilled axe of green serpentine, found in a turbary, near Laveno. The original has been figured.‡

Upon Tablet 16 is the cast of a broken drilled axe of serpentine, found in Lake Como. The original has been figured.§ The three last-mentioned specimens are in the Museum at Milan.

Upon Tablet 13 is the wax model of a leaf-shaped flint spearhead, found at Calindasco, near Plaisance. The original, which has been figured,‖ is in the Museum at Lugano.

At Cumarola, a few miles from Modena, forty human skeletons were discovered, in 1856, simply buried in the earth three feet deep, and lying in two rows. Professor Cavedoni has given a detailed report of this discovery.¶ Each of these skeletons had, on the right side, turned upwards, a socketed lance-head of copper, probably mixed with a little tin, and on the left a flint arrow-head. Besides these, some had on the right side a wedge-shaped lance-point; others a similar weapon of very hard serpentine; and others, again, had above the head a drilled stone axe of serpentine. One of these skeletons was distinguished from the rest by having on the right side a large, well-worked lance-head, and above the skull a bronze tube. The objects found at the same place, with other skeletons, in 1773, are preserved in the Museum of the Royal University. Some of these—consisting of a curious implement of green serpentine; a pointed implement and a drilled axe, both of serpentine; some stemmed flint arrow-heads; and a wedge-shaped

* Pallastrelli, 'La Citta d'Umbria nell Apennino Piacentino,' Piacenza, 1864. Gastaldi, *l.c.*, pp. 127, 128.

† Marinoni, 'Le Abitazioni Lacustri e gli avanzi di umana industria in Lombardia,' published in the proceedings of the 'Società Italiana di Scienze Naturali,' Tomo iv., n. 3, plate vi., fig. 21.

‡ Marinoni, *l.c.*, plate vi., fig. 1.

§ Marinoni, *l.c.*, plate vi., fig. 2.

‖ Marinoni, *l.c.*, plate vii., fig. 17.

¶ 'Ragguaglio archeologico intorno allo scoprimento di un antico poliandrio o sia tumolo sepolcrale di circa xl. guerrieri colle loro armi,' in the 'Messaggiere di Modena,' 24th Dec., 1856, No. 1486.

celt, a spear-head, and a dagger-blade of bronze—have been figured.* Although this interment does not belong to the Stone period, it may safely be assigned to an early part of the Bronze age, and shows, in a very interesting manner, the contemporaneous use of both stone and bronze for weapons by the same people.†

Sig. G. Cerchiari collected nearly thirty flint spear and arrow-heads, several stone hatchets, and a drilled axe-hammer of diorite, upon the hills near Imola. These objects were most abundant in some parts of the parish of Goccianello. They have been described and figured by Dr. G. F. Scarabelli,‡ and some of them have been figured by Mr. J. E. Lee, F.S.A.§ There is good reason for concluding that these implements were made upon the spot, as the flint is of the same kind as that met with in the neighbourhood; several of the arrow and spear-heads are only in process of manufacture, and waste chips and flakes of flint are abundant. With the stone implements were found some "spindle-whorls" of terra-cotta and of mica schist.‖

Upon Tablet 4 is the cast of a stone hatchet from Torée.

Sig. Lioz has mentioned several places in north-eastern Italy where flint flakes and flint arrow-heads have been discovered; these are Val di Barco, Val di Lonte, Monte Castello, Monte Grumi, Monte degli Schiavi, Padua, the neighbourhood of Treviso, and San Vito da Tagliamento. Sig. Lioz also found two flint arrow-heads, and other worked flints, in a red breccia, under a layer of stalagmite, in the cave of Colle di Mura; and in the cave of Chiampo, in a similar deposit, he found worked flints, associated with bones of the Cave bear (*Ursus spelæus*).¶

In working a stone quarry at Cantalupo, two sepulchral chambers were discovered. They were hollowed out of the rock, and were situated the one above the other. In the upper sepulchre two human skeletons were found. A drawing of the skull belonging to one of these skeletons was exhibited by M. Rossi, at the Paris Exhibition, 1867. It was of the brachycephalic type. With these remains were found a number of nicely-worked flint arrow-heads, and a very fine flint spear-head of the

* Keller, 'Lake-Dwellings,' plate lxv., fig. 3—14. See also pp. 236, 237.

† See pp. 36 and 166.

‡ In the 'Annali delle Scienze Naturali di Bologna,' 1850.

§ Keller, *l.c.*, plate lxv., fig. 21, 25.

‖ Gastaldi, *l.c.*, pp. 2, 3. Keller, 'Lake-Dwellings,' p. 238.

¶ Gastaldi, *l.c.*, pp. 125, 126.

stemmed type, having four notches upon the stem, probably to assist in securing it more firmly to the shaft. In the lower sepulchre, three human skeletons were found, but no other objects. Judging from M. Rossi's drawing of one of the skulls it must have been dolichocephalic.*

Stone implements and arrow-heads have been found near Ancona. The country people pick up the arrow-heads and wear them as charms against lightning. According to Sig. Nicolucci the same superstition prevails in the neighbourhood of Naples.†

Upon Tablet 2 *a* is the cast of a stone hatchet from Ascoli.

Spear and arrow-heads, scrapers, and implements of flint have been found at various places in southern Italy. The following list of localities was published in 1863:—Sora, Castelluccio, San Vicenzo in Val Roveto, Altamura, Ponte Corvo, Colle San Magno, Palezzolo, San Pietro in Curulis, Alvito, Monte San Giovanni, Città Antica, Campoli, Luca, and Baljorano.‡ In 1867 the names of other places were added to the list then published:—Isola di Sora, Aquino, Casalvieri, the neighbourhood of Terracina, and Gravina.§

Evidence of the existence of a Stone age in Italy is not confined to the mainland. In the Christy Collection are some flakes, and implements of jasper, quartz, flint, and obsidian, which were found in the Island of Elba. The series includes part of a stemmed arrow-head. These specimens were presented by Dr. Raffaello Foresi, of Florence. Dr. Foresi was led to the discovery of these objects by observing flint arrow-heads in the peasants' houses. They were regarded as amulets, and were frequently hung round the children's necks to protect them from being struck by lightning, the people believing them to be thunder-stones.‖ A similar superstition exists

* 'Matériaux,' *l.c.*, vol. iii., p. 326. M. Rossi's drawings gave each skull in three different aspects.

† Keller, *l.c.*, p. 238.

‡ Nicolucci, 'Di alcune armi ed utensili in pietra rinvenuti nelle provincie meridionali dell' Italia,' Naples, 1863, extracted from vol. i. of the 'Atti della R. Accademia.'

§ Nicolucci 'Sopra altre armi ed utensili in pietra dura rinvenuti nell' Italia meridionale,' Naples, July, 1867, reprinted from 'Rendiconto Accad. della Sc. di Napoli.'

‖ See pp. 87-91. The *general* belief, unlike that which obtains in Italy, appears to be that stone *hatchets* are thunder-stones, and that flint *arrow-heads* are the weapons of elves or spirits. Since the notice at pp. 87-91 has been in print my attention has been called, by Mr. George Morrison, of Hamptworth, to the following passage in a letter written by Dr.

among the peat-cutters in Piedmont, and among the country people in the neighbourhood of Naples. Signor de Bosis, of Ancona, obtained seven flint arrow-heads, which were found at Monte Oro, near Castelfidardo, and on the hills of Barcaglione; he procured them from the country people, by whom they were collected, and who kept them to preserve their houses from being struck with lightning, believing them to be thunderbolts.* As already mentioned,† a flint arrow-head forms the central pendant of a Greek or Etruscan gold necklace, now preserved in the British Museum. Three ancient flint arrow-heads, mounted in silver, each having a loop for suspension, and doubtless intended to be worn as amulets, were sent to the Paris Exhibition, 1867, from the island of Elba, by Dr. Foresi. In the Christy Collection a leaf-shaped flint arrow-head, set in silver, and probably intended to be worn as an amulet, is exhibited from Italy.

The discovery of flint implements in the island of Elba by Dr. Foresi dates from the commencement of 1865. The specimens are most abundant about the Gulf of Lacona, on the south of the island. The objects appear to have been made upon the spot, as waste flakes and cores are found. Nine-tenths of the flint implements already collected are made from varieties of flint absolutely unknown in the island. The arrow-heads are of the stemmed and triangular types, the latter not unfrequently

Hickes to Pepys, dated London, June 19, 1700:—"At the same time, as I remember, he (Lord Tarbut) entertained the duke (Duke of Lauderdale) with a story of Elf Arrows, which was very surprising to me. They are of a triangular form, somewhat like the beard or pile of our old English arrows of war, almost as thin as one of our old groats, made of flints or pebbles, or such-like stones, and these the country people in Scotland believe that Evil Spirits (which they call Elves, from the old Danish word *Alfar*, which signifies *Dæmon*, *Genius*, *Satyrus*) do shoot into the hearts of cattle; and, as I remember, my Lord Tarbut, or some other Lord, did produce one of these Elf arrows, which one of his tenants or neighbours took out of the heart of one of his cattle that died of an usual death. I have another strange story, but very well attested, of an Elf arrow that was shot at a venerable Irish Bishop by an Evil Spirit, in a terrible noise louder than thunder, which shaked the house where the Bishop was; but this I reserve for his son to tell you, who is one of the deprived Irish Clergymen, and very well known, as by other excellent pieces, so by his late book, entitled '*The Snake in the Grass*.' I mention this to encourage you to desire my Lord to send you a more perfect account of these Elf arrows."—'Memoirs of Samuel Pepys, Esq., F.R.S.,' edited by Richard, Lord Braybrooke. London: Colburn, 1825, vol. ii., p. 187.—E. T. S.

* Gastaldi, *l.c.*, p. 6.

† Page 88.

of a rather elongated form. Many of the arrow-heads are remarkably small. The flint scrapers are of the usual form. Some of the hatchets are made by chipping only. A few objects made of hyaline quartz, and three cores of obsidian, found at Ponte Jerrago, Elba, were included in the large series sent by Dr. Foresi to the Paris Exhibition. The obsidian was probably obtained either from the south of Italy or from Sardinia.*

M. Simonin has described the stone implements found in the island of Elba in a paper read at the meeting of the 'Académie des Sciences,' Paris, 14th August, 1865.†

Arrow-heads, knives, and axes of flint and stone have been found in some caves in Sicily by Baron Anca.‡ A hatchet of 'Lydian quartz' is mentioned by Sig. Gastaldi as having been found in Sardinia.§

B 29.

Casts and Models of Objects found in the Lake-Dwellings of Lake Varese, Lombardy.‖

As mentioned at p. 125, Sig. Stoppani has discovered the sites of five distinct pile-villages in Lake Varese. These have been named Isolino, Cazzago, Bodio, Keller, and Desor. The Abbé Ranchet subsequently discovered a sixth, which is called Bardello. A plan, showing the relative positions of these vil-

* 'Matériaux,' *l.c.*, vol. ii., pp. 96—98. 'Promenades Préhistoriques,' *l.c.*, pp. 133—135.

† 'Comptes Rendus,' vol. lxi., pp. 303—305.

‡ 'Bull. de la Soc. Géol. de France,' 1860.

§ Gastaldi, *l.c.* p. 97.

‖ 'Matériaux,' *l.c.*, vol. iv., p. 23. Information upon the lake-dwellings of Italy will be found in the undermentioned pamphlets and works. Mortillet, 'Sur les plus anciennes traces de l'homme dans les lacs et les tourbières de Lombardie,' in the 'Atti della Societa Italiana di scienze naturali,' vol. ii. Lioy, 'Le abitazioni lacustri dell' età della pietra nel Vicentino,' Venice, 1865. As mentioned at page 126, Sig. Lioy has found flint flakes and implements of stone upon the site of a pile-village in the marshy ground near the lake of Fimon. Lioy, 'Di una stazione lacustre scoperta nel lago di Fimon,' in the 'Atti della Soc. Ital. di. Sci. Nat.' vol. vii., p. 167, 1864. The discoveries in the lake of Garda have been cited at p. 126. Stoppani, 'Sulle antiche abitazioni lacustri del lago di Garda,' in the 'Atti della Soc. Ital. di Sci. Nat.,' vol. vi., p. 181, 1864. The following work is an excellent *resumé* of the discovery of prehistoric remains in Italy:—'Lake-habitations and prehistoric remains in the turbaries and marl-beds of northern and central Italy,' by Bartolomeo Gastaldi, translated by Charles Harcourt Chambers, and published by the Anthropological Society of London.

lages, has been published.* At Bodio station some implements of bronze have been found. At Isolino, and at Keller, the only objects of bronze hitherto met with are some fish-hooks.† The flint arrow-heads found at Bodio, at Isolino, and at Keller, are remarkable for the fineness of the workmanship and the length of their barbs. See specimens upon Tablet 12 *d* and *e*, from Isolino; and models of others upon Tablets 11 and 12 *a*, from Bodio. The discoveries of Captain Angeluni (director of the Museum of Artillery, in the Arsenal of Turin) in lake Varese, have been noticed at p. 125.‡

Upon Tablets 5 and 6 are casts of stones, from Bodio, which appear to have been used for polishing implements. In Mr. Evans's collection, at Nash Mills, are two small discs of flint, found in Yorkshire, which have apparently been used as polishers. From their small size and unartificial form such objects are likely to escape notice; they should be sought for in other localities.

Upon Tablet 7 are casts of grooved stones, from Bodio, perhaps grooved in sharpening tools. The original of *a*, described as a "net-sinker," has been figured.§ Upon Tablet 21 *a* is the cast of a similar object from the pile-dwelling called Keller, Lake Varese. The Indians of California reduce the shafts for their arrows to the proper size by drawing them between two stones with notches in them.‖ Can these Italian grooved stones have been used for straightening arrow-shafts? Two grooved stones, closely resembling the specimens found in Italy, are in the collection of the Rev. E. Duke, of Lake House. They were found in a tumulus upon Lake Down, near Stonehenge. A similar grooved stone was found, in 1801, by the late Mr. Cunnington, in a tumulus (No. 4), at Upton Lovel, near Heytesbury, Wilts. It is preserved in the Stourhead Collection, and has been figured.¶

* Marinoni, 'Le abitazioni lacustri e gli avanzi di umana industria in Lombardia,' Milan, 1868, in the 'Societa Italiana di Scienze Naturali,' vol. iv., No. 3. The plan is given in plate 1, fig. 2. Information as to the pile-dwellings in lake Varese, pp. 14—24.

† Stoppani, 'Prima ricerca di Abitazioni lacustri nei Laghi di Lombardie,' in the 'Atti della Soc. Ital. di Sci. Nat.,' vol. v., Gastaldi, *l.c.*, pp. 122—124.

‡ Angeluni, 'Le Stazioni Lacunali del lago di Varese,' Como, 1863.

§ Marinoni, *l.c.*, plate iii., fig. 2.

‖ 'Bulletin Amer. Ethno. Soc.,' March, 1862, p. 13.

¶ Hoare, 'Ancient Wiltshire,' vol. i., plate vi. About three dozen pointed bone implements were found in this tumulus, and Sir Richard Colt Hoare has suggested (p. 75) that the grooved stone was used for sharpening them.

Upon Tablet 8 *a* is the cast of a stone hatchet from the central pile-village at Bodio. This specimen appears to have been purposely blunted.* The original has been figured. †

Upon Tablet 8 *b* is the cast of a hatchet of green serpentine, found in a turbary near Cazzago. The original has been figured. ‡

Upon Tablet 22 are casts of stone hatchets from the pile-village at Bodio; *a* and *c* have been figured. §

Upon Tablet 9 *c* is the wax model of a flint spear-head from the pile-village at Bodio; the original has been figured. ‖

Upon Tablet 9 *a*, *b*, *d*, and *e*, upon Tablet 10 *b* and *c*, and upon Tablet 12 *b* and *c*, are wax models of flint saws (?) from Bodio station, Lake Varese.

Upon Tablet 10 *a* is the wax model of an amulet (?) of micaceous quartzite, in the form of a ring, from Bodio station; the original has been figured. ¶

Upon Tablet 11 *a*, *c*, *d*, and *f*, and Tablet 12 *a* are wax models of barbed flint arrow-heads, from Bodio station; one of the same type has been figured.**

Upon Tablet 12 *d* and *e* are two stemmed and barbed flint arrow-heads, from Isolino station, Lake Varese, presented to the Collection by Mr. J. W. Flower, F.G.S., who has also given many of the casts from the lake-dwellings of Lake Varese.

Upon Tablet 11 *b* is the wax model of a flint spear-head, from the pile-dwellings of Isola Camilla, Lake Varese; the original has been figured.††

Upon Tablet 11 *e* is the wax model of a leaf-shaped flint arrow-head, also from Isola Camilla; the original has been figured.‡‡

Upon Tablets 17 to 21 are casts of "spindlewhorls" §§ of stone and terra-cotta from Bodio and Keller stations. 17 *a* only shows the commencement of drilling.

* See remarks upon blunted implements, at page 91.

† Marinoni, *l.c.*, plate iii., fig. 13.

‡ Marinoni, *l.c.*, plate vi., fig. 5.

§ Marinoni, *l.c.*, plate ii., fig. 38, 39.

‖ Marinoni, *l.c.*, plate ii., fig. 15.

¶ Marinoni, *l.c.*, plate iii., fig. 22.

** Marinoni, *l.c.*, plate ii., fig. 1. Other stemmed flint arrow-heads, some of which are barbed, found at Bodio station, have been figured in plate ii., fig. 2-8, 13 and 14.

†† Marinoni, *l.c.*, plate ii., fig. 16.

‡‡ Marinoni, *l.c.*, plate ii., fig. 12.

§§ See page 94.

Stone "spindle-whorls" have been figured from the pile-dwellings of Bodio* and Isola Camilla,† both in Lake Varese. "Spindle-whorls" of baked clay have been figured from Bodio (Keller settlement)‡ and Isola Camilla.§ Terra-cotta "spindle-whorls" are met with in the country about Imola, Bologna, Modena, in Parma, Piedmont, and Lombardy; they also occur in "shell-mounds" at some metres above the sea-level, in the neighbourhood of Cagliari, Sardinia.‖

The originals of nearly all the casts exhibited from Italy are preserved in the Museum at Milan.

In the Christy Collection is a series of stemmed and barbed arrow-heads, and other implements of flint, from the lake-dwellings of Lake Varese, presented by M. Gabriel de Mortillet.

A 34 and A 35.

Flint Implements from Belgium.

The worked flints exhibited in these Cases were found, together with many similar specimens, on the rising ground to the south-east of Mons, between Spiennes, Nouvelles, and Harmignies; they are most abundant on the lands to the south and south-west of Spiennes.¶ This series formed part of the Toilliez Collection. M. Désiré Toilliez announced the discovery of implements near Spiennes to the Academy of Sciences of Belgium in 1847.** After the death of M. Toilliez, in 1865, his prehistoric collection passed into the hands of Mr. John Evans, F.R.S., who has presented specimens of the Spiennes implements to several public Collections, including the Blackmore Museum. In 1866, M. C. Malaise attempted to assign these objects to the Quaternary period, and M. Le Hon, in "L'Homme fossile," fell into the same error. Mr. Evans and the late M. Toilliez shared the idea that a manufactory of flint implements had existed near Spiennes, and that the specimens found there are the rejected implements and waste pieces. In this opinion MM. Gabriel de Mortillet, Cornet, A. Briart, and d'Omalius

* Marinoni, *l.c.*, plate iii., fig. 2—4.

† Marinoni, *l.c.*, plate iii., fig. 7.

‡ Marinoni, *l.c.*, plate iii., fig. 5, 6.

§ Marinoni, *l.c.*, plate iii., fig. 8, 9.

‖ Gastaldi, *l.c.*, p. 97.

¶ C. Malaise, 'Bull. Acad. de Belgique,' 5th Jan., 1866, ser. 2, vol. xxi., pp. 4—11. 'Matériaux,' *l.c.*, vol. ii., pp. 428—430.

** 'Bull. Ac. R. Belgique,' 1847, 1848, 1849, 1851.

coincide.* Flint implements, bearing a considerable resemblance to the Spiennes specimens, have been found in some pits in Cissbury Camp, near Worthing, Sussex. The discovery was made by Col. A. H. Lane Fox, F.S.A., in Sept., 1867. In all, about 600 specimens were found, only one of which was polished; no metal implements were found with them.† A good series of the Cissbury implements has been presented by Col. Lane Fox to the Christy Collection. The Rev. Canon Greenwell obtained a large number of flint implements from the Cissbury pits in 1868, and among them were two boring tools.

A 34.

Nos. 4 to 8 are chipped flint implements. Nos. 7 and 12 are flint cores. No. 5 *a* and *b* are flint flakes. The other specimens are rude flint implements, many of which are probably in an unfinished state, or rejected during the process of manufacture.

A 35.

The chipped implements in this Case consist of three principal forms—narrow tools pointed at one end, such as Nos. 15 and 16; ruder implements pointed at both ends, as Nos. 2 and 3; and hatchets with a broad edge for cutting, as Nos. 10 and 13. Nos. 8, 9, 19, 20, and 22 have been polished.

Holland.

No specimens from Holland are in the Collection.

The flint and stone implements found in Zeeland, like those obtained in North Germany, are usually of Scandinavian types. Several specimens found in Zeeland are preserved in the Hanover Museum, some of which have been figured; among

* F. L. Cornet and A. Briart, 'Bull. Ac. R. Belgique,' 1st Feb., 1868, pp. 126—138; d'Omalius, 1st Feb., 1868, pp. 73—79. A. Briart, F. Cornet, and A. Houzeau de Lehaie, 'Rapport sur les découvertes géologiques et archéologiques faites à Spiennes en 1867.' Mons, 1868. 'Matériaux,' *l.c.*, vol. ii., pp. 428—430, vol. iv., pp. 119—121.

† A. H. Lane Fox, 'Examination of the Hill Forts of Sussex, with an account of excavations at Cissbury and Highdown.' 'Archæologia,' vol. xlii., 1869.

them is a chipped flint hatchet,* a flint gouge,† and a flint arrow-head.‡ A drilled stone axe of Scandinavian type, found in Zeeland, is in the Schwerin Museum, and has been figured.§ A polished flint hatchet and a polished greenstone hatchet, both found in Holland, are shown in the Christy Museum.

A 34.

Germany.

No. 19 is a stone hatchet, found near Quedlinburg, Prussia. (Klemm. Coll., 2432).

No. 20 is a stone hatchet found at Thale, near Aschersleben, Prussia. (Klemm. Coll., 2090.)

No. 21 is a stone hatchet, very flat on the under side; it was found near Quedlinburg. (Klemm. Coll., 2460).

Nos. 22 to 24 are drilled stone axes from North Germany.

No. 25 is a stone chisel, and No. 26 is a stone hatchet, both found in Hungary; they have been presented to the Collection by Mr. J. W. Flower, F.G.S.

Nos. 19 to 21 have been presented to the Collection by Mr. Augustus W. Franks, V.P.S.A. Although the series exhibited is so very small, yet a large number of stone implements have been found in Germany.

There is a considerable general resemblance between the flint and stone implements and weapons found in North Germany and those met with in Scandinavia. A flint knife of the flat leaf-shaped type, like No. 16, Case C 25, a flint dagger of the type of No. 13, Case C 27, and a semi-lunar flint scraper of the same type as those in Case C 25, all of which were found in the island of Rügen, and are now preserved in the Christy Collection, might easily be mistaken for Danish specimens. Two flint daggers of Scandinavian type found in Germany have been figured by Dr. Lindenschmit. One is preserved in the Hanover Museum; it was found at Husum (Wölpe, Hanover);‖ the

* Lindenschmit, 'Die Alterthümer unserer heidnischen Vorzeit,' heft ii., taf. 1, n. 14.

† Lindenschmit, *l.c.*, heft ii, taf. 1, n. 8.

‡ Lindenschmit, *l.c.*, heft vi., taf. 1, n. 16.

§ Lindenschmit, *l.c.*, heft iv., taf. 1, n. 2.

‖ Lindenschmit, *l.c.*, heft vii., taf. 1, n. 4.

other specimen has that fine "crimped" work upon the handle which is seen upon some of the more elaborately finished Scandinavian flint daggers; it was found near Rhede (Borken), and is now in the Münster Museum.* Other examples of the flat thin type of flint knives are figured in "Horæ Ferales," from specimens in the Schwerin Museum.† This type of weapon, although more common in, is not peculiar to, the north of Europe, for in the same work there is a figure of a similar flint knife, now preserved in the British Museum, which was found in 1834, in the bed of the Thames, off Whitefriars.‡

Flint daggers of the type of No. 13, Case C 27,§ found in Germany, have been figured from specimens in the Schwerin‖ and the Berlin Museums.¶ Two semi-lunar flint scrapers, resembling the Scandinavian specimens, are figured in "Horæ Ferales." One of these is in the Schwerin Museum; it was found in a turf moor, at Lungensee, Amt Criwitz;** the other, now in the Hanover Museum, was found in Holstein.†† Flint arrow-heads do not appear to be met with very abundantly in Germany. Dr. Lindenschmit has figured a few. One stemmed and barbed, and two stemmed flint arrow-heads, are preserved in the Münster Museum; these were found at Kloppenburg (Oldenburg).‡‡

Stone hatchets found in Germany have been figured from specimens in the collection of M. Schönemann, Wolfenbüttel;§§ and in the Schwerin ‖‖ and the Mayence Museums.¶¶ Stone gouges found in Germany have been figured from specimens in the Schwerin *** and the Hanover Museums.††† A flint chisel found at Puttbus, Isle of Rügen, is preserved in the Berlin Museum;

* Lindenschmit, *l.c.*, heft vii., taf. 1, n. 6.

† 'Horæ Ferales,' plate ii., fig. 25, 26.

‡ 'Horæ Ferales,' plate ii., fig. 27.

§ No good example of this type of flint dagger is in the Collection; No. 13, Case C 27, has been re-sharpened, over and over again, until the typical form of the blade has been changed to that of a mere pointed weapon.

‖ 'Horæ Ferales,' plate ii., fig. 28, 30, 31.

¶ 'Horæ Ferales,' plate ii., fig. 29.

** 'Horæ Ferales," plate ii., fig. 34.

†† 'Horæ Ferales,' plate ii., fig. 35.

‡‡ Lindenschmit, *l.c.*, heft vi., taf. 1, n. 3, 4, 5.

§§ 'Horæ Ferales,' plate ii., fig. 1.

‖‖ 'Horæ Ferales,' plate ii., fig. 4.

¶¶ Lindenschmit, *l.c.*, heft ii., taf. 1, n. 6, 7, 13, 15-23.

*** 'Horæ Ferales,' plate ii., fig. 16, 18, 19.

††† 'Horæ Ferales,' plate ii., fig. 17.

it has been figured.* A grooved stone "net-sinker" of the usual type, found in Germany, is preserved in the Christy Collection. A drilled "net-sinker" of grey sandstone, found at Oldenburg, Holstein, has been figured;† it is now in the Hanover Museum.

Dr. Lindenschmit considers that the last and most difficult process in the manufacture of stone axes was the drilling, and that the implements were shaped before this operation was commenced. In one plate of his valuable work he has given a series of figures to illustrate the process of drilling stone axes. Two examples show no trace of drilling; they are merely blocked into shape. ‡ All the other specimens show various stages in the process of drilling,§ and one specimen is completed.‖ Dr. Lindenschmit remarks that the boring appears in some instances to have been performed in the simplest, but most tedious, manner, by turning a hard stone or a very hard piece of wood, with sand and water, working from both sides towards the centre in the manner already described.¶ He also remarks, that with many drilled implements the openings widen so much from the middle towards both sides, that the holes could not have been intended for hafting, whilst the number of specimens having this kind of drilled hole is too great to favour the supposition that they are in an unfinished state. It is probable that such specimens as those cited and figured by Lindenschmit** were held between the finger and thumb at the drilled part. This has already been noticed with reference to hammer stones†† and the three specimens figured by Lindenschmit are of this type.‡‡

Dr. Lindenschmit figures three unfinished stone axes, all in process of being drilled with a hollow tool; one was found in Rhenish Bavaria, it is now in the Mayence Museum.§§ Another, broken across a former haft hole, has a second drilled hole

* 'Horæ Ferales,' plate ii., fig. 24.

† Lindenschmit, *l.c.*, heft ii., taf. 1, n. 5.

‡ Lindenschmit, *l.c.*, heft viii., taf. 1, n. 1, 2.

§ Lindenschmit, *l.c.*, heft viii., taf. 1, n. 3—6, 8—12.

‖ Lindenschmit, *l.c.*, heft viii., taf. 1, n. 7.

¶ See page 96.

** Lindenschmit, *l.c.*, heft viii., taf. 1, n. 4, 5, 6.

†† See pp. 92-93.

‡‡ N. 4 was found at Ahlden (Lüneburg). n. 5 is without locality; both are now in the Hanover Museum. N. 6 was found at Gendringen, province of Geldern; it is now in the Leyden Museum.

§§ Lindenschmit, *l.c.*, heft viii., taf. 1, n. 10.

commenced above the fracture; it was found in the Lüneburg district; it is now in the Hanover Museum.* The third was found in the lake-settlement of Wangen,† and is now in the Prince's Museum at Sigmaringen;‡ this last-mentioned specimen appears to have been fractured during the process of drilling.

Dr. Lindenschmit has alluded to the hollow bronze object, formerly in the collection of Dr. Klemm at Dresden, and supposed to have been used for drilling stone axes; this implement has recently been acquired by Mr. Franks, together with the Klemm Collection of stone implements, and is now in the Christy Museum. It is open to doubt whether this bronze "borer" has been used for the purpose suggested.

Several drilled stone axes, found in Germany, are in the Christy Collection; one specimen shows a number of planes upon its surface, caused by its having been rubbed into shape upon a flat grindstone.§ In the same Collection there is a partly drilled stone hammer, found at Kalinowiz; in drilling this object a hollow tool has been used, for the core still remains attached at the base of the hole. One of the drilled stone axes in the Christy Collection has the haft hole unusually near the cutting edge; probably this has resulted from the implement having been repeatedly ground to a fresh edge after it had been broken in use. The haft hole, particularly in the narrow variety of stone axe, is generally near the thick or hammer-proper end of the implement. Drilled stone axes are comparatively rare in England and France, more common in Wales,‖ Ireland, and Scotland,

* Lindenschmit, *l.c.*, heft viii., taf 1, n. 11.

† See pp. 142—146.

‡ Lindenschmit, *l.c.*, heft viii., taf. 1, n. 12.

§ See p. 102.

‖ The Rev. E. L. Barnwell informs me that drilled stone axes are common in Wales, especially in North Wales. He found one worn down to a very thin state, as it had been used for rubbing the stone floor of a kitchen by the servant for some time. Ancient stone implements have been applied by their modern possessors to very singular and unexpected purposes. It has been mentioned, at page 100, that Dr. Junghuln, for many years, used an ancient stone hatchet for smoothing the surface of his paper, whenever he had to execute minute drawings. At page 103, the use of ancient stone hatchets, by weavers, in the north of Ireland, has been noticed. Mr. John Evans possesses an ancient stone hatchet which has been used as a weight for a clock. The perforated "loom weight," No. 6, Case D 13, so long as it was perfect, was used, at the end of a cord, for fastening a horse to the manger. The serpentine adze blade

and still more plentiful in Germany.* Drilled stone axes, found in Germany, have been figured from specimens now preserved in the Hanover,† the Berlin,‡ the Mayence,§ the Schwerin,‖ the Augsburg,¶ the Wiesbaden,** and the Hildesheim†† Museums.

Many of these specimens are very highly finished. Some are of fanciful forms; one is elaborately ornamented with longitudinal striæ on the sides, and another is ornamented with singular raised ribs, made apparently in imitation of the seams of bronze castings; this last was found in Mecklenburg, and is in the Schwerin Museum. A drilled serpentine axe, ornamented with striations upon the surface, is preserved in the Wiesbaden Museum.‡‡ This specimen is far less finely worked, the form is more simple, and the ornamental striæ are less carefully executed, than is the case with two stone axes found at Buxtehude, Hanover, one of which has been figured.§§ Two stone implements, in form something like No. 13, Case A 49, from Mississippi, U.S.A., each having a similar drilled hole, and both found in the neighbourhood of Mayence, are preserved in the Mayence Museum, and have been figured.‖‖ A thin disc of clay

No. 11, Case A 53, was in constant use as a wedge for preventing a door from slamming when open. The very fine stone hatchet, No. 20, Case A 52, has, in modern times, served for a whetstone. It was presented to the Collection by Mr. Jones, who has given the following information respecting it. His letter is dated June 3, 1869. "Having occasion to ask a servant if she had anything in the shape of a whetstone in the house, to my great surprise she brought me the stone hatchet which I send for addition to your Collection. It was left, many years ago, by a naval officer who had been much engaged in the Pacific and South America. The landlady, who gave it to me, says that it is from South America."—E. T. S.

* 'Horæ Ferales,' p. 139.

† 'Horæ Ferales,' plate iii., fig. 1. 2, 12, 14, 16, 19. Lindenschmit, *l.c.*, heft viii., taf. 1, n. 7, heft iv., taf. 1, n. 4, 5, 6, 9, heft 1, taf. 1, n. 1, 2, 3, 4, 9, 12, 14.

‡ 'Horæ Ferales,' plate iii., fig. 5, 9, 10, 17, 18, 21, 22, 23.

§ Lindenschmit, *l.c.*, heft i, taf. 1, n. 5, 6, 7, 13.

‖ Lindenschmit, *l.c.*, heft iv., taf. 1, n. 1, 8, 10, 11.

¶ Lindenschmit, *l.c.*, heft iv., taf. 1, n. 12.

** Lindenschmit, *l.c.*, heft iv., taf. 1, n. 3.

†† Lindenschmit, *l.c.*, heft iv., taf. 1, n. 7.

‡‡ Lindenschmit, *l.c.*, heft 1, taf. 1, n. 16.

§§ Lindenschmit, *l.c.*, heft iv., taf. 1, n. 5, 6. 'Horæ Ferales,' plate iii., fig. 12.

‖‖ Lindenschmit, *l.c.*, heft ii., taf. 1, n. 10, 12.

slate, about four inches in diameter, with a sharply ground edge and a drilled central hole, has been figured;* it was found in the neighbourhood of Schauen, near Osterwick, district of Halberstadt, and is now in the Collection of Baron Groote, of Schauen.

* Lindenschmit, *l.c.*, heft ii., taf. 1, n. 11.

SHELL-MOUNDS OF DENMARK.

C 23 AND C 24.

THE objects in these Cases have been obtained from the "Shell-Mounds" and "Coast-finds" of Denmark. The Shell-Mounds, or Kjökkenmöddings,* are heaps of shells, mixed with broken bones and other refuse, which have accumulated around the sites of ancient dwellings. At Havelse, the mound is in the form of an irregular ring: the central space was probably the site of the hut, or huts. At one time the Danish shell-mounds were thought to be natural deposits—in fact, "raised beaches;" but this was proved not to be the case, for the shells in them belong entirely to full-grown, or to nearly full-grown, individuals, and consist of four kinds which do not live together, and do not require the same conditions. The Danish shell-mounds are frequently of great extent, being sometimes more than 300 yards long, 10 feet thick, and from 100 to 200 feet broad.

The people who resorted to these spots, to feed upon the shell-fish found close at hand, were probably of migratory habits. Remains of the wild goose are found in the shell-mounds. As this bird is only a winter visitor, it would seem that the shell-mounds were sometimes occupied even in cold and inclement weather. No trace of grain has been met with in the shell-mounds. Bones of the sheep, horse, reindeer, and domestic fowl are absent. Polished stone implements themselves have not been met with in the shell-mounds, but both Mr. John Evans and Professor Steenstrup have found pieces of polished stone

* The name "Kjökkenmöddings" is derived from *kjökken* (kitchen) and *mödding*, corresponding to our local word midden or midding, a "refuse heap." The carrion crow, in some districts, is known as the *Midden-crow*. T. Wright, 'Dictionary of Obsolete and Provincial English,' p. 672.

hatchets, some of which had been worked up into tools and scrapers.*

Shell-Mounds of America.

Shell-mounds, resembling the Kjökkenmöddings of Denmark, have been observed in many parts of the world; indeed, they are still being formed by the Fuegians, and some other savages. The Fuegians, who live chiefly upon shell-fish, constantly change their place of residence, to which they return at intervals, adding at each visit to the piles of old shells, which often amount to many tons in weight.† From the uncleanly habits of savages, a frequent change of residence is necessary on the ground of health. Shell-mounds, in particular, appear to have contained the whole refuse of the settlement, which was thrown out, as it is by the Ahts of the north-west coast of America at the present day, whose camp is described as being surrounded with putrid fish and castaway molluscs,‡ which the elements and the birds clear away during the time that the site remains unoccupied. §

Some shell-mounds were examined by Mr. Rau in 1863-4, at Keyport, Monmouth County, New Jersey, U.S.A. The most abundant shells in them were those of the oyster and the clam; shells of periwinkle, however, were present. Mingled with the shells were broken animal bones, many fragments of pottery, and numerous stone implements, which last are very scarce in this part of New Jersey, except in the shell-mounds. The appearance of these mounds is like that of a snow-covered field, from the great number of bleached shells of which they are formed.‖ One mound extends over an area of six or seven acres, and in parts the deposit is from five to eight feet thick. Mr. Rau collected more than three hundred specimens in this shell-mound, and in the immediate neighbourhood; consisting

* For an account of the Danish shell-mounds see 'Prehistoric Times,' pp. 172—197. Lubbock, in 'Nat. His. Review,' vol. i., p. 489.

† Darwin's 'Journal,' p. 234.

‡ Sproat, 'Scenes and Studies of Savage Life,' p. 42.

§ Sproat, *l.c.*, p. 38.

‖ Darwin remarks of the shell-mounds in Tierra del Fuego—"These heaps can be distinguished at a long distance by the bright green colour of certain plants which invariably grow on them."—'Journal,' vol. i., p. 272.

of grooved stone-axes, flint flakes, flint arrow and spear-heads, and pottery. A large number of waste flakes and unfinished arrow-heads were found, tending to show that the implements had been made upon the spot.

The last Indians who periodically came to this neighbourhood belonged to the tribe of Narragansetts. They visited the spot every year, in order to gather shell-fish for winter use. *

The farmers in Long Island burn the shells obtained from these mounds for lime. Two centuries and a quarter ago the Dutch colonists of Manhattan Island made the same use of the shell-mounds which had been formed by the Indians there. In the account of New Netherland, given by the Jesuit missionary, Isaac Jogues, is the following passage:—"Lime they make of oyster shells, great heaps of which are found here, made formerly by the savages, who subsist in part by that fishery." †

Sir Charles Lyell has described a shell-mound on St. Simon's Island, near the mouth of the Altamaha River, in Georgia, which covered ten acres of ground, and had a depth of from five to ten feet. ‡

Shell-mounds exist on the shores of every State, from Connecticut southward along the Atlantic and Gulf of Mexico. Some of them are of enormous extent, covering several acres of ground.

In Florida there are very many shell-mounds. At Fernandina, a new town on Amelia Island, a layer of shells exists along the face of the bluff for 150 yards, extending inland for a quarter of a mile; in parts the deposit is three feet in depth, composed almost wholly of oyster shells, with a few shells of clams and conchs. Similar deposits are found in various parts of the island, and on the opposite mainland. They occur on both sides of the entrance to the St. John's River, and on Anastasia Island. One of the most remarkable is Turtle Mound, on Mosquito Lagoon, near New Smyrna. It is thirty feet thick, and is composed almost entirely of oyster shells, with a few shells of conch and clam. Another very similar shell-mound exists

* The natives of the north-west part of America collect and dry mussels for winter use. Lord, 'Naturalist in Brit. Columbia.'

† 'Memoir of a Captivity among the Mohawk Indians, a Description of New Netherland in 1642-43,' by Father Isaac Jogues. Republished by John Gilmary Shea, New York, 1857, p. 57.

‡ Lyell, 'Second Visit to the United States,' vol. i., p. 252.

opposite New Smyrna. A shell-mound on Crystal River, on the Gulf Coast, four miles from its mouth, is about forty feet thick, the surface being nearly level. It is thirty feet broad.*

A description of some "Fresh-water Shell-Mounds," which exist on the banks of the St. John's River, East Florida, has been published by Dr. Wyman, who examined them in February and March, 1867, in company with Mr. G. A. Peabody and Mr. George H. Dunscombe.† These heaps of shells are distributed over an area of more than 150 miles, between Palatka and Salt Lake, and are nearly all situated on knolls. They are composed almost exclusively of shells of *Ampullaria depressa*, *Paludina multilineata*, and *Unio Buckleyi*. In size, the mounds vary from circular heaps, fifteen or twenty feet in diameter, to long ridges several hundred feet in length, and from four to five, or even in some cases fifteen feet thick. The shell-mound at King Philip's Town is about 450 feet long, and from 100 to 120 feet broad. Its greatest thickness is about eight feet. Fragments of pottery and broken animal bones abound in it. One of the largest shell-mounds on the St. John's is at Black Hammock; it is about 900 feet long, and varies in breadth from 100 to 150 feet. The shells in this mound are chiefly *Paludinæ*, although *Unies* and *Ampullariæ* are met with. Pottery and broken bones are also abundant in this mound. Other similar shell-mounds have been examined at Old Enterprise, on the north-eastern shore of Lake Monroe; and at Horse Landing, on the St. John's, from which last deposit Mr. Peabody obtained a rude arrow-head of flint, a material not found *in situ* in this part of Florida.

Although the shell-mounds of the St. John's River consist of fresh-water shells, objects made from marine shells are occasionally met with in them; the shells which have been so used are chiefly *Strombus gigas*, *Pyrula carica*, and *P. perversa*. Chisels, gouges, and hatchets made of such shells have been found; a large specimen of *Pyrula perversa*, with the inner whorls removed, as with the shell No. 26, Case E 6, was obtained at Blue Spring. No pipes, or fragments of pipes, have been found; stone objects, indeed, appear to be rare in these fresh-water shell-mounds. But one stone chisel, and about twenty-five stone arrow and spear-heads appear to have been collected by Dr. Wyman, and these were chiefly met with in the vicinity of the mounds,

* Daniel G. Brinton, 'Notes on the Floridian Peninsula," Philadelphia, 1859.

† 'American Naturalist,' vol. ii., Nos. 8 and 9.

not in the mounds themselves. A disc of shell, with a hole drilled through the centre, similar to No. 1*a*, Case D 19, was obtained. The animal remains include bones of deer (*Cervus Virginianus*), bear, racoon, opossum, terrapin (*Emys Floridana*), turtle, alligator, catfish, and gar-pike. Bones of birds are rare.

The mounds of oyster-shells on the sea-coast of Florida have been described by Dr. Brinton,* who also observed mounds of mussel-shells, while he was connected with the Army of the Cumberland in the war of the rebellion.† Count Pourtalès visited some shell-mounds at Old Enterprise, Lake Monroe, in 1858. Mounds of mussel-shells, containing objects of human workmanship, have been noticed on the banks of the Muskinguru River.‡ Dr. Wyman, Mr. Emerson, Mr. Elliot Cabot, and others, have examined some shell-mounds on the banks of Concord River, in Massachusetts, consisting of *Unio complanatus*, and containing charcoal, worked flint, and bone.§ Dr. Joseph Leidy has described some shell-mounds which exist at Cape Henlopen.‖ Professor Whitney and Dr. Wm. H. Brewer have noticed vast numbers of fresh-water shell-mounds in California. Indeed, they appear to be widely scattered throughout the United States. Shell-mounds exist in Newfoundland.

Sir Robert Schomburgk has examined numerous heaps of conch shells (*Strombus gigas*) in the West Indies; they occur on the eastern point of the island of St. Domingo. "These shells have, invariably, a hole near the spire, which was made for the purpose of detaching the animal from the shell, and so as to extract it with ease." ¶

Shell-Mounds in other Parts of the World.

Mr. G. Windser Earl has examined some shell-mounds in the province of Wellesley, in the Malay Peninsula.**

Lime was made by burning the shells found in these mounds. One mound of cockle-shells is described as dome-shaped, about eighteen feet high, and nearly 200 paces in circumference at its

* 'Notes on the Floridian Peninsula,' p. 166.

† 'Smithsonian Reports,' 1866, p. 356.

‡ 'Archæologia Americana,' vol. i, p. 226.

§ 'Proceedings Boston Society of Nat. His.,' vol. xi., p. 243.

‖ 'Proceedings Acad. Nat. Sciences,' 1866.

¶ 'Ethnological Researches in Santo Domingo,' in the Report of the British Association, July, 1851, pp. 90—92.

** 'Trans. Ethno. Soc.,' 1863, vol. ii., pp. 119—129. New Series.

base. No other shells than those of *full-grown* cockles were found, either in this mound, or in the other mounds subsequently examined by Mr. Earl.*

The Andaman Islanders make shell-mounds at the present day; and one, on Viper Island, was levelled by the Public Works Department in 1861. Shell-mounds have been examined in Australia† and Tasmania.

Dr. Milligan, in describing the shell-mounds left by the natives on the shores of Tasmania and the adjacent islands, says that in places where the shells are univalves, round stones of different sizes are met with; one, the larger, on which the shells were broken; the other, and smaller, having served as the hammer with which to break them. But when the shell-mound consists of oysters, mussels, cockles, and other bivalves, then flint knives, used in opening them, are generally found.‡

We need not, however, in all cases, expect to find, in the shell-mounds, implements used for opening the molluscs, inasmuch as without doubt they were often opened by other means. The Indian women on the Columbia, who collect clams for food, hollow out a ring in the ground, about eight inches deep, which they fill with large pebbles, made red-hot in the camp fire; upon these the clams are laid; the heat speedily causes them to open; the clam is then extracted with a pointed stick; it is strung with others on a cord, smoked and subsequently eaten.§ The New Zealanders open mussels in a similar manner: when smoked they are said to taste like old cheese, and to keep for years.‖

Shell-mounds have been discovered and examined in Great Britain. They were observed by Dr. Gordon, of Birnie, on the shores of the Moray Frith. A very large shell-mound exists at a place called Brigzes, on Loch Spynie. Mr. Roberts has described some shell-mounds at Bennet Hill, near Burghead,¶ and Mr. Laing, M.P., F.G.S., has given an interesting account of several shell-mounds examined by him in Caithness. The deposit in the "Churchyard" shell-mound was at least five feet thick, and it covered an area of several hundred square yards. In this deposit, chiefly towards the middle and base of it, chipped flints

* Living shells of the same species still exist in the neighbourhood, but in very small quantities; they are used as food by the Malays.

† Pinkerton, 'Travels,' vol. ii., p. 473.

‡ 'Trans. Ethno. Soc.,' 1863, vol. ii., p. 128.

§ Lord, 'Naturalist in British Columbia,' vol. i., pp. 186—190.

‖ Library of Entertaining Knowledge, 'New Zealanders,' p. 212.

¶ 'Anthropological Review,' Feb. 1864.

and rude implements of stone and bone were found, as well as fragments of coarse pottery.* In the "Harbour" shell-mound the deposits appear to have been made at different periods; the shells were chiefly those of limpets. The "Churchyard" shell-mound was composed mainly of periwinkle shells.†

Although fish abound upon the coast, yet fish-bones are not abundant in the Caithness shell-mounds; while they are, according to Sir John Lubbock,‡ very numerous in the Danish kjökkenmöddings. Bones of the Great Auk (*Alca impennis*) occur in the Caithness shell-mounds as well as in the shell-mounds of Denmark. The Great Auk is now extinct in Europe, having but lately died out in Iceland; it is said still to survive in Greenland.§

The shell-mounds in Orkney correspond with those in Caithness. In each case periwinkle and limpet shells form the staple of the midden, with the addition of cockle and oyster shells in some of the sheltered bays where these molluscs are now found. Fishbones are more abundant in some of the Orkney than in the Caithness mounds.‖

Some shell-mounds in Cornwall and Devonshire have been described by Mr. Pengelly and Mr. Spence Bate.¶

Sir John Lubbock, Mr. Evans, and Mr. Prestwich found a shell-mound at St. Valéry, close to the mouth of the Somme, France.**

Mr. Flower found an extensive kjökkenmödding in the Island of Herm. The shells and broken bones were here intermingled wit hand-made bricks,†† querns, tiles, fragments of iron, bronz

* 'Prehistoric Remains of Caithness,' pp. 20—22.

† Ibid., pp. 22—30.

‡ 'Prehistoric Times,' p. 181. The most common species in the Danish shell-mounds are *Clupea harengus* (herring), *Gadus callarius* (dorse), *Pleuronectes limanda* (dab), and *Muræna anguilla* (eel). Mr. John Evans does not consider that fish remains are *very* abundant in the Danish shell-mounds.

§ 'Prehistoric Remains of Caithness,' p. 50.

‖ Ibid., pp. 58-59.

¶ The Rev. E. L. Barnwell, in a letter dated July 19, 1869, informs me that numerous small heaps exist upon the sea-shore between Barmouth and Harlech. Upon removing the sand, they are found to contain bones of animals, and stones which have undergone the action of a strong fire. In one instance part of a stone quern was met with. The depth and extent to which these heaps extend in the sand has not been ascertained, as no regular examination of them has yet been made. Mr. Barnwell has himself collected specimens from these heaps.—E. T. S.

** 'Prehistoric Times,' pp. 177, 178.

†† See page 61.

and glass, several pieces of Samian ware, and polished stone implements of a peculiar form.*

Objects from the Kjökkenmöddings of Denmark are shown in Cases C 23 and C 24.

C 23.

All the specimens exhibited from the shell-mounds and coast-finds of Denmark have been presented to the Collection by Mr. John Evans, F.R.S.

Upon Tablets 8 to 11, and 13 *b*, are flint cores, flakes, and implements, from a shell-mound at Meilgaard. This shell-mound is one of the largest and most interesting hitherto discovered; it is situated in a beautiful beech forest, called "Aigt," or "Aglskov," on the property of M. Olsen, not far from the sea-coast, near Grenaa, in north-east Jutland. The mound is about ten feet thick in the middle, from which, however, it slopes away in all directions; round the principal mound are several smaller mounds of the same nature. Over the shells a thin layer of mould has formed itself on which the trees grow. The entire thickness of the mound consists of shells; oysters being, at Meilgaard, by far the most numerous, with here and there a few bones, and still more rarely stone implements, or fragments of pottery. Excepting just at the top and bottom, the mass is quite unmixed with sand and gravel; and, in fact, contains *nothing* but what has been, in some way or other, subservient to the use of man.†

The specimens on Tablets 9 *b*, 10, and 11, are small triangular "axes," which are very characteristic of the coast-finds and the kjökkenmöddings. They are flat on one side, and more or less convex on the other; rudely triangular or quadrangular in shape, with the cutting edge at the broader end, and from 2½ inches to 5½ inches in length, with a breadth of 1½ inches to 2½ inches. They are never ground, and the cutting edge, though not sharp, is very strong, as it is formed by a plane, meeting the flat

* Flower, 'Journ. Anthropological Soc.,' July, 1869. Some of the hand-made bricks, and polished stone implements, found in the shell-mound at Herm, are shown in Case D 14; they have been presented to the Collection by Mr. Flower.

† Lubbock, 'Prehistoric Times,' pp. 175, 176.

side at a very obtuse angle. Professor Steenstrup doubts whether these curious and peculiar implements were ever intended for axes; he regards them as having been used as "sinkers," and figures somewhat similar objects which are applied to this purpose by the Esquimaux. The so-called edge, in his opinion, neither has, nor could have, been used for cutting. Sir John Lubbock rather inclines to the belief that they really are "axes," and he figures a kjökkenmödding axe and a special form of New Zealand adze, side by side, in support of his opinion.* A cast of this New Zealand adze is shown in Case A 53, No. 14. The original is in the British Museum; it was brought from New Zealand by the Rev. R. Taylor; the edge of this specimen, unlike that of the kjökkenmödding axes, is produced by rubbing.

Upon Tablet 12 is a kjökkenmödding flint axe. Nilsson figures one of these implements and describes it, provisionally, as an "ice-chisel from the Baltic coast."†

Mr. Flower, of Croydon, has recently found a flint implement on the surface, near Thetford, which closely resembles this kjökkenmödding type of axe. One class of the quartzite implements, obtained from the laterite deposits of Madras, have the edge formed by bold flaking, as is the case with the kjökkenmödding axes.

The specimens on Tablets 14 and 15, 13 *a*, are flint flakes and cores from the shell-mound at Sölager; upon Tablet 7 *a*, Case C 24, is a rude pounding-stone or hammer from the same locality.

C 24.

Upon Tablets 5 and 6 are flint flakes and implements from the shell-mound at Havelse; 7 *b* is a rude pounding-stone from the same locality. The shell-mound at Havelse, on the Isefjord, is of small extent, and although close to the shore, is quite beyond the reach of the waves. It is in the form of an irregular ring, enclosing a space on which the ancient dwelling or dwellings probably stood.‡ Upon Tablet 8 is a flint core from the shell-mound at Magleö. Upon Tablet 9 are some flint flakes from the shell-mound at Gundsömagle. Upon Tablet 10 are flint flakes from the shell-mound at Bilidt, on the Isefjord. Upon Tablets 11 to 15 are flint flakes, cores, and rude implements from the "coast-find" at Korsör.

* 'Prehistoric Times,' figs. 79—84, pp. 72, 73.

† 'Stone Age of Scandinavia,' plate vi., fig. 141.

‡ 'Prehistoric Times,' p. 174.

"Coast-finds" of Denmark.

"Coast-finds" are discoveries of rude flint implements, which are found lying in large numbers on certain spots along the old line of coast. They are called "Kystfunden" by the Danish antiquaries. Owing, probably to the elevation of the land which has taken place in Jutland since the Stone period, some of these "coast-finds" are now on dry ground, and as the shore is very flat, the elevation, slight as it is, has in some cases been sufficient to separate them by a considerable distance from the present water-line. Some, on the other hand, are at lower levels; one, for instance, close to the Railway Station at Korsör, is exposed only at low tide, and others are always covered. The coast-finds probably belong to different classes. Thus, one at Anholt was evidently a workshop of flint implements, as is shown by the character of the chips, and by the discovery of more than sixty flint cores. Those, on the contrary, which even at the present day are under water, must have been so in old times, and, as there are no traces of lake-dwellings in Denmark, Sir John Lubbock has suggested that they indicate the places where the fishermen, formerly, were accustomed to drag their nets. It is still usual to choose particular spots for this purpose, and it is evident that many of the rude objects used in fishing, especially the stones employed as net-weights, would there be lost. The objects discovered are what might have been expected under these circumstances. They consist of irregular flint chippings, net-sinkers, slingstones, flakes, scrapers, awls, and axes. Sir John Lubbock and Professor Steenstrup, in about an hour's search, found at Froëlund, near Korsör, 141 flakes, 84 net-weights, 5 axes, 1 scraper, and about 150 flint chips. At a similar spot near Aarhuus in Jutland, Sir John Lubbock picked up, in two hours and a half, 76 net-weights, 40 flakes, 39 scrapers, 17 awls, and a considerable number of flint chips. In the sheltered and shallow fjords of Denmark, the sea is generally calm, and, in many instances, a layer of sand has accumulated over and thus protected the flint fragments. This was the case with both the above-mentioned coast-finds, one of which was exposed in draining the land, and the other in making a railway cutting. Of course, in a sea like that which surrounds our coast, such remains would soon be reduced to mere gravel; besides which, we must remember that on our southern and eastern shores the sea has encroached greatly, even in historical times.

Mr. John Evans suggests that some of the coast-finds may be due to shell-mounds having been destroyed by inroads of the sea.

"Flint-finds," resembling in some respects these Danish coast-finds, are not altogether unknown in Britain. A great number of flint flakes, with a few arrows and cores, were found some years ago by Mr. Shelley in the neighbourhood of Reigate. Mr. T. F. Jamieson mentions a spot on the banks of the Ythan below Ellon, where in a few minutes he filled his "pockets with flint flakes, abortive arrow-heads, flint blocks from which the flakes have been struck off, and other such nondescript articles of ancient cutlery."* There are other places, as, for instance, Bridlington;† Cissbury Camp, near Worthing;‡ Pontlevoy; Spiennes, near Mons;§ and Pressigny le Grand,‖ where numbers of rude hatchets, cores, flakes, spear-heads, &c., have been found. Sir John Lubbock's remark, "Now that our attention has been called to these flint-finds, no doubt many similar discoveries will be made elsewhere,"¶ is being verified almost daily. The discoveries made by the late Lieut. Swiney, at Jubbulpore, Central India,** appear to be of this nature; as do also those at Toome, Lough Neagh. But it is not necessary to look beyond our own district for examples of flint-finds. Mr. Joseph Stevens, of St. Mary Bourne, has described a flint-find at Breachfield, about a quarter of a mile north-east of St. Mary Bourne, near Andover.†† Close to Salisbury there are many flint-finds; they occur at Petersfinger and Ashley Hill, both on the south-eastern side of Salisbury, as well as on the rising ground near the gravel pit, above Bemerton and elsewhere. Many of these flint-finds probably indicate the site of a temporary settlement. Flint-finds extend over a comparatively small area, and the flint-flakes and implements become more and more scarce as you walk from a central space, at which they are usually very abundant, and which, probably, marks the site of the encampment.

* 'Aberdeen Journal,' October, 1863.

† See pages 75—77.

‡ See page 186.

§ See pages 185, 186.

‖ See pages 105—107.

¶ 'Prehistoric Times,' pp. 80—82.

** See pages 108, 109. See also 'Proceedings Asiatic Soc. of Bengal,' Feb., 1869, pp. 52, 53.

†† 'A Descriptive List of Flint Implements found at St. Mary Bourne.' London, Tennant, 1867.

A 36 to A 39, C 22 to C 27.

Flint and Stone Implements from Sweden and Denmark.

The immense number of stone implements found in Scandinavia has often been mentioned, indeed the whole country is a museum upon a grand scale. No flint implements of palæolithic types have hitherto been met with in Scandinavia. Sir John Lubbock has failed to find a single specimen in the museums at Copenhagen, Stockholm, Lund, Flensborg, or Aarhuus; he has also examined many private collections without discovering any; his opinion is that Scandinavia was not peopled during the Palæolithic period.*

Stone Hatchets.

The typical Scandinavian flint hatchet has straight sides: † flint hatchets with oval sections are, however, found in Scandinavia,‡ although they are not at all abundant; specimens with this oval section are in Mr. Evans's splendid collection, at Nash Mills. In both the Nash Mills and the Christy Collections are some rudely chipped flint implements, found in Denmark; these are possibly in an unfinished state, but of course were never intended to be made into hatchets with straight sides; they are not unlike the flint implements from Spiennes in Cases A 34 and A 35. The series of flint implements from Denmark in the Christy Museum has recently been greatly enriched by the acquisition of the very fine collection formed by M. Worsaae.

A 36.

Very few of the flint hatchets in this Case have been rubbed or polished. Nos. 3, 11, 12, and 13, however, are exceptions. Nos. 1 and 4 are nicely chipped; Nos. 7 and 17 have the peculiar "crimped" work at the edges seen in perfection upon the handles of some Scandinavian daggers. No. 9 is bruised at the end, as if from being struck with a hammer-stone.

* Nilsson, 'Stone Age of Scandinavia.' Edited by Sir John Lubbock, Bart. Editor's preface, p. vii.

† Nilsson, *l.c.*, plate vii., fig. 157, 158, both from Scania, Sweden. 'Prehistoric Times,' plate i., fig. 1. Worsaae, 'Nordiske Oldsager,' fig. 6, 8, 11, 12. Lindenschmit, 'Die Alterhümer unserer heidnischen Vorzeit,' heft ii., taf. 1, n. 14.

‡ Nilsson, *l.c.*, plate vi., fig. 145, plate vii., fig. 151, 152. Worsaae, 'Nordiske Oldsager,' fig. 9.

C 22.

No. 1, 2, and 5 are rubbed stone hatchets.
No. 4 is a whetstone for hatchets.

Grindstones and Whetstones.

According to Professor Nilsson, these whetstones are usually made of a quartz sandstone belonging to the old transition sandstone occurring in strata near Cimbritshamn, Gladsax, Andrarum, and Hardeberga, in Scania. The surface of the whetstones always shows distinct marks of sharpening or grinding. They vary considerably in size and shape. The majority have not been portable, but have been lying in or beside the huts of the natives. Some of them, however, are small, flat, or annular; such a stone may have been carried in the pouch on hunting excursions. Occasionally large hard sandstone blocks are met with, on which there are indentations, evidently produced by grinding objects of stone and not objects of metal. A block of this kind is preserved at Barsebäck, and is in the Collection of the late Rev. Mr. Hofverberg. The largest whetstone in Professor Nilsson's Collection is of an oblong form, about two feet long, eleven inches broad, and seven and one-third inches thick; it has on one of its broad sides a smooth indentation (the effect of grinding), running lengthwise, almost of the same length and breadth as the stone itself. The whetstones are usually oblong, polygonal, thin in the middle and thicker at the ends, some being from fourteen to fifteen inches in length.* The ground surfaces, running lengthwise, are plane, concave, or convex. Flint gouges, which exactly fit the concave excavations, are sometimes found by the side of the whetstones. Whetstones have frequently the shape of a thick thigh-bone; and whenever the discovery of a very large petrified bone is announced, we may be certain, says Professor Nilsson, that it is nothing else than such a whetstone.

Whetstones are occasionally short and nearly square, but are always thinnest in the middle.† A large oblong boulder has sometimes been used as a whetstone.‡ It has been already

* Nilsson, *l.c.*, plate ii., fig. 15. Worsaae, 'Nordiske Oldsager,' fig. 36.

† Nilsson, *l.c.*, plate ii., fig. 16. The original is in the Collection of Professor Nilsson, now in the Academy at Lund; it is nine inches long. In the same Collection is another whetstone only four inches long and one inch thick, the four sides being very slightly rounded.

‡ Nilsson, *l.c.*, plate ii., fig. 17.

mentioned* that revolving whetstones were unknown in prehistoric times; the implements and weapons were ground upon flat stones, as masons grind their chisels, or carpenters their plane-irons. Many flint and stone hatchets show a number of planes upon their surface arising from this mode of polishing and sharpening them.† See Nos. 2 and 6 in Case A 29.

C 22.

Stone implements resembling No. 3, Case C 22, are, with some hesitation, classed by Nilsson as stone anvils;‡ they may have been used as mealing stones, and probably do not belong to a very early period. The under surface of No. 3 is much worn, apparently from rubbing.

C 23.

Nos. 1 to 7, rubbed stone hatchets.

C 24.

No. 1 is a rubbed stone axe; it was perhaps intended to be drilled. Nos. 2 and 3 are drilled stone axes. No. 4 is the upper stone of a quern, probably of late date; it was found at Rendsburg.§

A 37.

STONE HATCHETS.

The flint hatchets in this Case are chiefly polished. No. 5 is a fine specimen; it is wholly unrubbed on the under surface, and is probably in an unfinished state. No. 7 shows considerable wear at the cutting edge.‖ No. 10 is greatly bruised at the butt end, as if it had been driven like a wedge by a number of blows. No. 20 is very highly polished. Three tolerably distinct types of hatchet will be observed in this Case.

* See pages 102, 106, 154.

† Wilde, 'Cat. Mus., R. I. Academy,' p. 47, fig. 54.

‡ One is figured as such by Nilsson, 'Stone Age of Scandinavia,' plate ix., fig. 187; it is noticed at page 80.

§ For a notice of querns, see pp. 62—64.

‖ A flint hatchet figured by Worsaae, in 'Nordiske Oldsager,' fig. 13, is much chipped from use at the cutting edge.

(*a*). Hatchets rather thick, and of nearly equal breadth throughout the length of the blade; such as Nos. 5 and 6.

(*b*). Hatchets tapering in width towards the butt end, and much thicker than *a;* such as Nos. 9, 11, 13, 14, and 16. Some examples of this type curve outward at each side of the cutting edge, such as Nos. 2 and 8.

(*c*). Hatchets resembling *b* in form, but much thinner and usually more highly polished than either *a* or *b;* such as Nos. 17 and 19 to 22.

Some Scandinavian flint hatchets are of large size. Sir John Lubbock mentions one in his possession which is thirteen inches long, one inch and a half thick, and three inches and a half in breadth.* Mr. John Evans, however, has a specimen of the same breadth, but sixteen inches and a quarter long.*

A 38.

Nos. 1 and 2 are flint hatchets.

STONE GOUGES.

Nos. 3 to 13 are flint and stone gouges.† Nos. 3 to 5 are unfinished. No. 8 is a good specimen; the present state of its edge shows that it has been used and then reground at a different angle.

The butt end of No. 7 is much bruised from use.

Flint gouges, although common in the north of Europe, are rarely found in Great Britain‡ or Ireland. Stone gouges have been met with in North America.§

In the Nash Mills Collection, one flint gouge is much bruised at the broad end; it appears to have been driven with a mallet, or perhaps even with blows from a hammer stone. In the same Collection are three flint gouges with a pointed oval section: the same number of this rare type of gouge are exhibited in the Christy Museum. Gouges of this type have been figured.‖

* 'Prehistoric Times,' p. 68.

† Flint gouges are figured by Worsaae in 'Nordiske Oldsager,' fig. 18. Nilsson, *l.c.*, plate vi., fig. 140.

‡ Some gouges of black flint are preserved in the Collection of the Cambridge Archæological Society, in the Fitzwilliam Museum.

§ 'Horæ Ferales,' p. 134.

‖ Nilsson, *l.c.*, plate vi., fig. 139. Worsaae, 'Nordiske Oldsager,' fig. 19, 'Prehistoric Times,' fig. 85.

Stone Chisels.

Nos. 14 to 20 are flint chisels. These tools are rarely found in Scandinavia made of any other material than flint. Professor Nilsson, however, possesses a chisel of diorite.* No. 20 is very broad, and in form connects the chisels with the hatchets. No. 14 is unfinished; it is rudely chipped into form. Nos. 16 and 18 are bruised at the butt end from use.

The largest flint chisel in the Nash Mills Collection measures ten inches in length; another specimen, nine inches and a half long and one inch and three-quarters wide, has nearly a square section; it was probably used in the hand, as all the edges at the sides have been removed by grinding; this specimen was found in Fyen.

Whetstones and Polishing Stones.

No. 21 is a whetstone† similar to No. 4, Case C 22. It is grooved from use. Nos. 22 and 23 are whetstones of different forms. Nos. 24 to 26 are polishing-stones; they belong, however, to a late period; the surface of No. 24 is much smoothed from use. Not less than a hundred similar whetstones have been found in the peat-mosses at Thorsbjerg, and Nydam, in South Jutland, associated with objects of the Early Iron Period. It has been suggested that the groove which is worked round these objects served for the reception of a cord by which they were carried hanging from the girdle.‡ Nilsson classes these objects as hammer-stones; he considers that the edges of stone tools have been struck against the grooved sides of these implements, in order to sharpen them.§

Hammer-Stones.

No hammer-stones of the ordinary types are included in the Collection. In the Christy Museum there is a hammer-stone from Denmark, of an oval form, with two depressions for the finger and thumb; ‖ another of an irregular form with two depressions, and a

* Nilsson, *l.c.*, pp. 54, 55.

† See page 99.

‡ 'Engelhardt, 'Denmark in the Early Iron Age,' p. 59, plate xii., fig. 12; plate xiii., fig. 65, 69.

§ Nilsson, *l.c.*, pp. 13—15, plate i., figs. 7, 8, and 10.

‖ See pp. 92, 93.

third of irregular form with three depressions; the last-mentioned specimen has been much used. A flint ball, found in Denmark, greatly bruised upon the surface, is also exhibited in the Christy Collection; this object was probably used as a hammer; it is identical in form and condition with the flint balls found in Yorkshire, Nos. 4, 5, 7, 9, 10, and 13, Case A 21; at Icklingham, No. 3, Case A 20, and near Salisbury Nos. 2 and 3, Case A 19. In the Nash Mills Collection there is a cylindrical hammer stone from Denmark, much bruised from use at each end. It resembles those obtained from the lake-dwellings of Switzerland, such as No. 12, Case C 21. There is also a grooved stone hammer or "net-sinker," * from Denmark, in form resembling the modern "net-sinkers" found near Ambleside, Nos. 29 and 30, in Case E 4.

Hammer stones of various types, found in Scandinavia, have been figured.†

Spindle-Whorls and Stone Discs.

Nos. 27 to 29 are stone "spindle-whorls."‡ Nilsson classes these objects as beads, and thinks that some of them may have been used as weights for drag-nets.§ In the Christy Collection there are some flat stone discs from Denmark, each with a central drilled hole; they measure from 4 to 4¼ inches in diameter, and are very nicely finished; a similar specimen has been figured. ‖

A 39.

Drilled Stone Axes.

The specimens in this Case are chiefly drilled stone axes and axe-hammers. Nos. 1 to 6 illustrate different stages in drilling. No. 1 is roughly chipped into form. No. 2 is not only blocked into shape, it is also rubbed; but the drilling has not been commenced. No. 3 shows a slight depression, the mere commencement of a drilled hole. No. 4 is drilled about half way through from one side only. No. 5 has been drilled from both sides; the holes have met, but more work had to be done in order to

* See p. 94.

† Worsaae, 'Nordiske Oldsager,' fig. 32, 33, 34. Nilsson, *l.c.*, plate i., fig. 1 to 14. Some of these were probably used as polishing-stones (figs. 8, 10).

‡ See page 94.

§ Nilsson, *l.c.*, plate ix., figs. 197—199.

‖ Worsaae, 'Nordiske Oldsager,' fig. 86.

render the hole of equal diameter throughout. With No. 6 this has been effected.* No. 10, and many of the stone axes in this Case, have probably been drilled with tools of metal.

A very interesting unfinished stone axe-hammer has been figured in 'Horæ Ferales.'† The implement has been shaped and polished, but it still remains attached at the base to the rough block of stone. Among the stone axes from Denmark in the Christy Collection, one shows the commencement of drilling on all four sides; another has been broken across the haft-hole, and a second hole has been commenced above the fracture on one side only; two others show the commencement of drilling on one side. Another broken stone axe shows the commencement of drilling on both sides, and another has the second hole, worked from both sides, nearly finished. In another specimen the first drilled hole, commenced on both sides, was nearly finished, although the two holes had not quite met; the implement was then, probably accidentally, broken; after this a second hole was commenced above the fracture on both sides, and is nearly completed. In Mr. Evans's Collection at Nash Mills there are some rare types of drilled stone axes from Denmark. Some of the specimens have been broken across the haft-hole, and a second hole has been commenced, or finished, so as to turn the fractured implement to account. In the same Collection there are examples of unfinished stone axes showing stages in the process of drilling. Several types of drilled stone axes have been figured by Nilsson.‡ One of these has been broken across the haft-hole and a second hole has been commenced above it. § In another example the second hole has been completed.‖ Worsaae figures many types of stone axes.¶ Some of these are remarkable as being, probably, copies in stone of metallic implements cast with many ornamental details of form and decoration.** The specimens figured by Lindenschmit as illustrating the stages of drilled stone axes have been already cited.†† In Mr. Evans's Collection there is a grooved stone axe,

* See remarks upon drilling at pages 96—98, 151—153.

† Plate iii., fig. 24.

‡ 'Stone Age of Scandinavia,' plate viii., fig. 163, 168, 169, 172, 173, 176, 177, 178, 179, plate ix., figs. 183, 184.

§ Nilsson, *l.c.*, plate x., fig. 207.

‖ Nilsson, *l.c.*, plate x., fig. 206.

¶ 'Nordiske Oldsager,' figs. 34—44. No. 44 shows a second hole drilled in a fractured implement, figs. 103—109.

** See figs. 103—109.

†† See page 189. Lindenschmit, *l.c.*, heft viii., taf. 1, n. 8—12.

almost of American type, such as Nos. 2 and 3, Case A 42; it was found at Frederiksborg. In the Christy Collection there are two grooved stone axes from Denmark, one about four and a half inches long, and the other about ten inches long; they somewhat resemble American types, but the hammer-end is more taper, and the groove is not sunk so deeply as in the American implements. Grooved stone axes from Scandinavia have been figured by Nilsson* and Worsaae. †

Methods of Drilling Stone.

Mr. Charles Rau, of New York, is of opinion,‡ after a careful examination and comparison of the haft-holes of European stone implements, that two different methods, or, at least, two differently shaped drills were employed in making the holes. Some of the perforations are of equal width throughout, the surface of the hole is smooth and shining, and exhibits at intervals circular striæ or furrows, which have the appearance of a succession of parallel rings. These perforations, Mr. Rau thinks, have been drilled with a hollow cylinder, perhaps with a bronze tube. In other specimens the haft-holes are more or less smooth, but are destitute of the annular striæ, and are sometimes narrower in the middle. These holes evidently were drilled from both sides of the implement, and the drill was not a hollow cylinder, but a solid body, probably only a stick. It is hardly necessary to add, that without the application of water and sharp sand, drilling either with a bronze tube, or with a stick, would have been impossible; the sand is, of course, the chief agent in the process. Mr. Rau has, as was once said of Mr. Pengelly, of Torquay, shown the perseverance of a savage, by perforating a piece of diorite with a stick and sand only. He employed the ordinary form of pump-drill, such as was used by the Iroquois for the purpose of obtaining fire by friction. §

The piece of diorite was one inch and three-eighths thick; it was so hard that a well-tempered knife produced no scratch on its surface, but merely a metallic streak. Mr. Rau at first used

* 'Stone Age of Scandinavia,' plate ii., fig. 31, 34, called plummets; probably these were used as net-sinkers; but the specimens, plate viii., fig. 166, 167, are unquestionably grooved axes.

† 'Nordiske Oldsager,' fig. 14.

‡ 'Drilling in Stone without Metal,' by Charles Rau, from the Report of the Smithsonian Institution, Washington, U.S.A. 1868.

§ Morgan, 'League of the Iroquois,' Rochester, 1851.

emery, but he found ordinary sand quite as effectual. He complains greatly of the tediousness of the drilling process; he never could endure to work at it for more than two hours in succession. Ultimately it took him two years before he pierced the stone. He found by measurement that two hours of constant drilling added not more than the thickness of an ordinary lead-pencil line to the depth of the hole. The shortening of the drilling stick was considerable; it was necessary to replace it several times. The first stick used by Mr. Rau was of tough ash wood; the others, which were of pine wood, proved to be quite as efficient. The deeper the drill penetrated into the stone, the more difficult the work became, which induced Mr. Rau, after having drilled through half the thickness of the stone, to begin another bore from the opposite side. In due time the two holes met in the middle.*

Mr. Evans exhibited, at the Prehistoric Congress, at Norwich, 1868, a stone hatchet from Switzerland, through which he had bored a hole with a piece of wood and sand.

C 25.

Flint Flakes and Cores.

Upon Tablets 3 and 4 are some flint flakes. 4 *b* and *c* have both been worn towards the point in so similar a manner, that it is suggestive of their having been used for some common purpose. No flint cores from Denmark, except from the shell-mounds, are in the Collection. Mr. Evans possesses a very fine flint core, found in Denmark; it is eight and a half inches in length and three inches in diameter. Some large flint flakes and flint cores from Denmark are in the Christy Collection.

Flint Arrow-heads.

Upon Tablets 5 and 6 are some flint arrow-heads; *e*, tablet 6 is a typical Scandinavian form. It is a long triangular prism, pointed at the top, and with a stem at the base in order to attach it to the shaft. The edges of these arrow-heads are often beautifully serrated.

A stemmed flint arrow-head from Denmark is shown in the Christy Museum, as well as some triangular flint arrow-heads, hollowed at the base. In the Nash Mills Collection these types are also present; one barbed and stemmed flint arrow-head is very finely worked. Several of the triangular flint arrow-heads

* For notices of drilling see pp. 96—98, pp. 151, 152.

in the Nash Mills Collection are very choice specimens; they are greatly hollowed out at the base, and have the barbs of considerable length.

A triangular, a leaf-shaped, and a stemmed flint arrow-head, found in Scania, Sweden, are preserved in the Museum at Mayence, and have been figured.* Flint arrow-heads of the peculiar Scandinavian type already mentioned are also in the Mayence Museum; two found in Scania have been figured,† as well as one found at Aby, Sweden.‡ Triangular flint arrow-heads found in Scania have been figured by Nilsson,§ as well as two stemmed arrow-heads from Sweden.‖ Flint arrow-heads have also been figured by Worsaae;¶ they are all very characteristic examples. A stemmed arrow-head of stone, about four and a half inches in length, found in Norway, was sent to the Paris Exhibition, 1867.

C 25.

Flint Spear and Harpoon-heads.

Upon Tablets 7 and 8 are flint spear-heads. None of the large triangular or stemmed flint harpoon-heads, to be seen in the Christy and the Nash Mills Collections, are in the Blackmore Museum. Some of these harpoon-heads are serrated at the edges in a most skilful manner; there are specimens at Nash Mills from eight to nine inches in length. In the Christy Collection there are twelve of the triangular type, hollowed at the base, ranging from three and a half to six and a half inches in length. One specimen, which has lost the point, still measures nine inches; it was probably one inch and a half longer. Worsaae figures a stemmed** and a triangular†† harpoon-head of flint.

Semi-lunar Flint Scrapers.

Upon Tablets 9 to 15 are semi-lunar flint implements.

Nos. 10 to 14 are polished at the straight edge from the friction of some soft substance, such friction as would arise from pulling the skin of an animal backwards and forwards over

* Lindenschmit, *l.c.*, heft vi., taf. 1, n. 2, 9, 10.
† Lindenschmit, *l.c.*, heft vi., taf. 1, n. 13, 15.
‡ Lindenschmit, *l.c.*, heft vi., taf. 1, n. 14.
§ 'Stone Age of Scandinavia,' plate iii., figs. 43, 48, plate v., 113, 114.
‖ Ibid., plate v., 106, 110.
¶ 'Nordiske Oldsager,' figs. 70, 71, 72, 73.
** Worsaae, 'Nordiske Oldsager,' fig. 67.
†† Ibid., fig. 68.

the edge; this polishing does not extend over the whole surface of the implements, but only to about three-fourths of an inch from the straight edge; the curved part of the flint was probably inserted in a block of wood, and would thus be guarded from friction.* No. 10 shows this polishing very distinctly.

The semi-lunar implements in the Nash Mills and the Christy Collections are very instructive; many of them are polished at the straight edge from use, the polishing extending some way down the sides. Mr. Evans possesses a flint scraper, found at Bridlington, Yorkshire, of the usual spoon-shaped type, which has been used so much that the marks of chipping, at the edge, are almost obliterated.

Although flint scrapers of the spoon-shaped type are not included in the Collection from Denmark, they are not uncommon in that country. A specimen in the Nash Mills Collection is very interesting, because it shows that it was intended to be hafted, in a similar manner to the Esquimaux specimen, No. 2, Case E 2. This Danish specimen was found by Mr. John Evans in a peat-moss, near Veddelöv. The central ridge has been completely removed by a series of blows, as far as, and no farther than, the scraper would have been inserted in the handle. In the Christy Collection, six flint scrapers, of the usual spoon-shaped type, are shown, from Denmark. Some of these are of large size.

C 26.

Upon Tablets 1 to 3 are other examples of semi-lunar flint implements; of these No. 3 is greatly polished from wear in the way previously mentioned. Worsaae and Nilsson each give three excellent typical figures of semi-lunar flint implements.† They are considered by some archæologists to have been used as knives or saws.‡

In Case C 25, upon Tablet 1, are some semi-lunar flint implements from Sweden.

Upon Tablet 4 is the cast of a semi-lunar flint implement.

Flint Knives and Daggers.

Dr. Lindenschmit admits the difficulty in separating the Scandinavian flint daggers and knives from the flint spear-heads;

* See notice of semi-lunar flint scrapers at p. 74.

† Worsaae, 'Nordiske Oldsager,' figs. 57—59. 'Stone Age of Scandinavia,' plate v., figs. 87, 88, 91. A fourth figure, 90, is given, but it is not so characteristic as the other three.

‡ Nilsson, *l.c.*, pp. 41—43.

he, however, points out that the thickness of the handles of many specimens would render it difficult to bind them to a shaft, and that they were probably used, as daggers or knives, in the hand.* There is also a difficulty in separating the knives from the daggers, and, indeed, the distinction, if made, must be very arbitrary, depending mainly upon the relative size, with, in the case of some of the flint daggers, certain peculiarities in the handles. Daggers of flint have been classed as belonging to two types:—1st, the broad leaf-shaped; 2nd, those having raised ridges at the handle. These last do not appear to have been found in Great Britain, although they are not uncommon in the North of Germany and Scandinavia.† Some flint knives have sharp edges at the sides for some distance from the point, but towards the butt end, the edges have been removed by grinding, apparently with the view of preventing the cutting of the string by which they were attached to the handle,‡ or of rendering them more comfortable for use in the hand.

C 26.

Upon Tablets 5 to 11 are flint spear-heads. Upon Tablets 12 to 16 are flint knives or daggers of the flat leaf-shaped type. Nos. 15 and 16 are fine specimens. In the Christy Museum, conspicuous from its size, being fifteen inches in length, and from the beautiful ripple-work upon the blade, is a flint knife of this leaf-shaped type, which formed part of the Worsaae Collection. It is said that the acquisition of this specimen, in his boyhood, induced M. Worsaae to turn his attention to the study of the antiquities of his native country.

C 27.

Upon Tablet 1 are flint spear-heads. Upon Tablets 2 to 13 are flint daggers; they are chiefly of the flat, leaf-shaped type. Nos. 4, 10, and 11*a* have had the sharp edges at the sides of the handle removed, so that they might not hurt the hand. No characteristic dagger with raised ridges at the handle is in the Collection. No. 7 is the only moderately good example of this type. No. 13 *has been* a good specimen of this type; it is, however, highly interesting in its present state, for it has been used, broken, and repointed, over and over again, until much of the

* Lindenschmit, *l.c.*, heft vii., taf. 1.

† 'Horæ Ferales,' p. 135.

‡ 'Man and his Earliest Known Works,' a paper read by Mr. John Evans, F.R.S., at the opening of the Blackmore Museum.

handle has been chipped away, whilst the blade is reduced to a mere narrow point. The original work can still be traced at the lower part of the handle. In Mr. Evans's Collection at Nash Mills there is a fine series of flint daggers from Denmark, the ripple-work upon the blades, and the "crimped" work upon the raised ridges of the handles of many of the specimens are perfectly astonishing. The workmanship of these daggers probably shows the greatest amount of skill which has ever been attained in flint-knapping. Yet these exquisitely chipped specimens, so frail that you scarcely dare to handle them lest they should slip through the fingers and break into a dozen pieces, even these have been used; they were not intended for show, but for actual use. Both in the Nash Mills and the Christy Collections specimens may be seen, which have been broken and repointed again and again, until nearly all the blade has been chipped away, as with the specimen No. 13 in this Case. Mr. Evans possesses the handle only of a flint dagger, and as none of the blade remained, this handle was ground to a cutting edge and has been converted into a chisel. Worsaae figures a perfectly used-out flint dagger; originally it was of the type with raised ridges at the handle; these ridges have, however, been nearly chipped away in repointing the weapon, the entire length of which is now barely four inches and a half.* Nilsson gives a list of stone implements, formerly in his Collection, now in the Academy at Lund, which have been formed out of broken fragments of tools belonging to a totally different class.

1.—Square narrow chisel, made out of a spear-shaft.
2.—Axe, made out of a large broken knife-blade.
3.—Axe, narrow and rounded at top, formed out of a worn-out broad axe.
4.—Spear-head, made out of a large knife-blade.
5.—Arrow-head, made out of the point of a knife-blade.
6.—Semi-lunar implement, transformed into a saw or toothed spear-head.†

It is strange that many of the flint daggers, although they must have cost much trouble in making, appear to have been exposed to very rough treatment. Some of them have been used for hammering, perhaps, even for knapping flint. They were held by the blade, and the blows were struck by the side

* 'Nordiske Oldsager,' fig. 64.
† Nilsson, *l.c.*, pp. 89, 90.

ridge of the handle. In some specimens the crimped work has been completely broken away from this use of the weapon. One specimen in Mr. Evans's Collection, found in Fyen, affords a remarkable instance of, what may be regarded as, this misuse of a highly-finished flint dagger.

A very illustrative flint dagger, in its original wooden handle, found in Egypt, has recently been added to the Collection at the British Museum;* it is, at present, placed in a central case in the second Egyptian Room. The blade is rather more than six inches in length, and is delicately chipped into form; the handle is about three inches long;† portions of the original scabbard still remain attached to the flint blade; these fragments of the scabbard are of leather, and some woollen fabric appears to have been used as a lining to it.

Another most interesting flint (chalcedony) dagger, of ancient Aztec workmanship, is preserved in the Christy Museum. It is mounted in the original wooden handle, which is encrusted with mosaic work of malachite, bone, shell, and turquoise.

Several flint knives and daggers, found in Denmark, are preserved in the Mayence Museum; some of these have been figured.‡ Two specimens show very fine crimped work on the handle.§ Other flint implements, described as lance-heads, but bearing a great resemblance to the daggers, are figured on the same plate; they were found in Sweden‖ and Denmark,¶ and are preserved in the Mayence Museum.

An English flint knife or dagger of the broad leaf-shaped form is preserved in the Christy Collection; it was found in the Thames at Battersea, and was presented by Mr. Augustus W. Franks, V.P.S.A. Another specimen, found in the Thames, is in the British Museum.

C 25.

Sweden.

Tablet 1.—Semi-lunar flint implements from Sweden.

Tablet 2.—Flint daggers from Sweden.

Among the stone implements from Sweden in the Christy

* See page 110.

† These measurements are only approximate.

‡ Lindenschmit, *l.c.*, heft vii., taf. 1, n. 1, 5, 9, 13.

§ Lindenschmit, *l.c.*, heft vii., taf. 1, n. 1, 6.

‖ Lindenschmit, *l.c.*, heft vii., taf. 1, n. 8, 10, 11, 12.

¶ Lindenschmit, *l.c.*, heft vii., taf. 1, n. 2, 7.

Collection are semi-lunar implements; hatchets, drilled axes, one showing the commencement of drilling, and a whetstone for hatchets. A drilled stone axe found in Sweden was in the Paris Exhibition, 1867; it had been broken across the haft-hole, and a second drilled hole had been commenced above the fracture. Unfinished stone axes from both Norway and Sweden were shown at Paris; some of these had been only partly drilled with a hollow tool, and the core remained in the hole, still attached at the base. A stone core cut out by such a hollow drill was shown from Sweden. Axes, with similar cores attached, were exhibited in Paris from the Swiss lake-dwellings, and two such specimens, found in Prussia, and now preserved in the Berlin Museum, have been figured.*

A very interesting class of weapon, probably used as a harpoon-head, is found in Scandinavia; it is made of bone, six to nine inches in length, with grooves at the sides, in which chips of flint are inserted. Mr. Evans possesses a very perfect specimen, found in Scania, and there are two others in the Christy Collection. Nilsson figures some.† Spears armed at the sides with quartz chips, in Case C 42, from Australia, although much more rude in their construction, offer an analogy to the Scandinavian weapons. The arming of weapons with sharks' teeth at the sides carries out, apparently, a similar idea.

* 'Horæ Ferales,' plate iii., fig. 22 and 23.

† 'Stone Age of Scandinavia,' plate vi., fig. 124—126.

Stone Period of America.

THE OBJECTS FROM AMERICA ARE EXHIBITED IN CASES A 40 TO A 52, B 30 TO B 34, C 28 TO C 39, D 19, E 6 TO E 13, AND H 11 TO H 14.

SOUTH AMERICA.

The South American series proper is small, but with it are classed some ancient Carib objects from the islands of St. Domingo and Barbados. Among these are some extremely interesting specimens.

CENTRAL AMERICA.

The Stone series from Central America is not very large. It contains several nearly unique specimens from Honduras, and some objects from Nicaragua. There is also a good series from Chiriqui, Veraguas.

NORTH AMERICA.

The Blackmore Collection illustrates rather fully the Stone period of those tribes who, at various times, have occupied the central district of North America, east of the Rocky Mountains. The specimens, however, are chiefly derived from that portion of this central district which lies eastward from the Mississippi river, between it and the Atlantic coast. Many of the objects are already known to archæologists from the description given of them by Messrs. Squier and Davis.*

* 'Ancient Monuments of the Mississippi Valley,' being vol. i. of the 'Smithsonian Contributions to Knowledge.' Washington, 1848.

The Stone series exhibited from the district west of the Rocky Mountains includes some interesting specimens from the neighbourhood of San Francisco, California. The Mexican Stone series is small. It is, however, sufficiently large to serve for the purpose of comparison, whilst the magnificent Collection of Mexican antiquities in the Christy Museum is accessible to those who desire to study this interesting branch of American archæology more in detail.

Divisions of the Stone Period of America.

It is very doubtful whether any stone objects exist in America answering to the Palæolithic implements of Europe. Some hornstone implements, Nos. 1 to 8, Case A 51, found in tumulus No. 2, on the north fork of Paint Creek, Ross co., Ohio, closely resemble some of the types which occur in the Drift and Cave deposits of England and France, but there is no reason for assigning to them an equal antiquity.

Sir John Lubbock considers that there are indications of the existence of four long periods, or phases of civilisation, in the central district of North America.

1. That in which, from an original barbarism, the American tribes developed a knowledge of agriculture and a power of combination.
2. That in which, for the first time, mounds were erected and other great works undertaken.
3. The age of the "garden-beds," which occupy some, at least, of the mounds. Hence it is probable that these particular "garden beds" were not in use until after the mounds had lost their sacred character in the eyes of the occupants of the soil, for it can hardly be supposed that works executed with so much care would be desecrated by their builders.
4. The period in which man relapsed into partial barbarism, and the spots which had been first forest, then, perhaps sacred monuments, and, thirdly, cultivated ground, relapsed into forest once more.*

* Mr. I. A. Lapham proposed a somewhat similar classification as being applicable to Wisconsin:—

1st. The period of the mound-builders.

2nd. That of the "garden-bed" cultivators.

3rd. That of occupancy by the modern race of Indians.

Sir John Lubbock is of opinion that all these changes may have taken place within the last three thousand years.*

American archæologists, however, contend that man existed with the mastodon, and of course they demand a far higher antiquity for primeval man, in their country, than three thousand years.

Dr. A. C. Koch gives an account† of a mastodon found in Gasconade county, Missouri, which had apparently been stoned to death by the Indians, and then partially consumed by fire. The fire, he says, was evidently "not an accidental one; but, on the contrary, it had been kindled by human agency, and, according to all appearance, with the design of killing the huge creature, which had been found mired in the mud, and in an entirely helpless condition. All the bones which had not been burnt by the fire, had kept their original position, standing upright, and apparently quite undisturbed in the clay, whereas those portions which had been exposed above the surface had been partially consumed by the fire. There were, also, found mingled with these ashes and bones, and partly protruding out of them, a large number of broken pieces of rock, which had evidently been carried thither from the shore of the Bourbense river, to be hurled at the animal by his destroyers; for the above-mentioned layer of clay was entirely void of even the smallest pebbles: whereas, on going to the river, I found the stratum of clay cropping out at the bank, and resting on a layer of shelving rocks of the same kind as the fragments; from which place it was evident they had been carried to the scene of action. I found, also, among the ashes, bones, and rocks, several arrow-heads, a stone spear-head, and some stone axes."

Dr. Koch has also stated that in another instance he found several stone arrow-heads mingled with the bones of a mastodon. "One of the arrow-heads lay underneath the thigh-bone of the skeleton, the bone actually resting in contact upon it, so that it could not have been brought thither after the deposit of the bone, a fact which I was careful thoroughly to investigate."

4th. The present period, when their descendants continued to visit the locality, and to bring hither the remains of their departed friends.
—'The Antiquities of Wisconsin,' 'Smithsonian Contributions to Knowledge,' 1855, pp. 19, 20.

* 'Prehistoric Times,' p. 234.

† 'Transactions of the Academy of Science of St. Louis,' 1857, p. 61, quoted in 'Prehistoric Times,' pp. 234, 235.

Colonel Charles Whittlesey, at a recent meeting of the American Association for the Advancement of Science, stated that this mastodon skeleton was found "in a peat layer, covered by alluvium, fifteen feet deep, at Pomme de Terre river, Missouri."

The question of the co-existence of man with the mastodon may fairly be left to be worked out by the American archæologists. One especial difference, however, appears to exist between the flint implements said to be associated, in America, with remains of the mastodon, and the flint implements found, in north-western Europe, with remains of the mammoth and other extinct mammalia. Dr. Koch does not mention that the implements, found associated with the mastodon bones, differ in any respect, as to form or type, from those found so abundantly scattered over the surface soil of the country. Indeed, he classes them at once as arrow-heads, spear-heads, and axes. Assuming, then, that the co-existence of man with the mastodon, in America, can be proved, it would appear that no special types of stone implements belong to, and are characteristic of, this earliest period in the Stone age of America. The divisions of the Stone age adopted in Europe —the Palæolithic period* and the Neolithic period†—are, therefore, not applicable to American antiquities, in the present state of our knowledge on the subject.

* See pp. 33—35.
† See pp. 35—38.

STONE PERIOD OF THE WEST INDIES.

Implements of Stone and Shell from the West Indies. Cases A 40, A 41, C 28, C 31, and H 11.

The implements made by the ancient Caribs differ in some respects from those made by other Stone-age races. Although the workmanship is frequently coarse, and the design is rude and grotesque, yet the stone implements of the ancient Caribs show immense variety in form and a considerable attempt at ornamentation, whilst the patience and the skill evinced in working very hard stones into elaborate shapes is remarkable.

The Carib race* was the predominant one in the Lesser Antilles, and occupied extensive regions of the mainland toward the Southern Atlantic seaboard.†

By some writers the ancient Caribs are thought to have belonged to the Nahuatl, or early Mexican family, whose descendants are thinly scattered along the Atlantic shore; a portion of the Nahuatl are imagined to have given rise to the Chorotecas and Nagradans, of Nicaragua.

A very interesting series of Carib stone implements was shown in the Paris Exhibition, 1867. These objects were found by Dr. Ferd. Cherminier and M. Mathieu Guesde, at Guadaloupe, Venezuela. Some of the specimens were of most singular forms; one, about eight inches long and four inches and a half broad, was hollowed into the form of an oval basin, and had an elegant curved handle. Several specimens, about two inches and three-quarters in diameter, were shaped like mushrooms; a curious

* Dr. Latham has remarked that among the Caribs certain objects have two names, one of which is applied by males, and the other by females only. The explanation offered is that the female terms belong to the language of the Arawaks, the earlier inhabitants of the islands, the males among whom are assumed to have been exterminated, and the women taken for wives by the conquering Caribs.

† Wilson, 'Prehistoric Man,' vol. ii., pp. 441—443.

stone club, about six inches and a half long, was shown; it was curved like a scimitar. From an absurd regulation no sketches were permitted to be made in the Exhibition, and the present writer was stopped in the very act of drawing some of these Guadaloupe specimens. Sketches alone could convey a clear idea of the shape and peculiarities of many of these curious objects. Among the simple forms of stone hatchets in the Guadaloupe series, was one, about four inches and a half long, which had the straight sides so characteristic of Scandinavian hatchets. A stone club of the dagger-like form of No. 10, Case A 40,* but only about six inches long, and two stone pestles, found in Cuba, were shown in the Paris Exhibition.

In order to prevent confusion in terms, it may be well to mention that the word "Carib" has ceased to be used among non-Spaniards, in application to any Indian tribe; it is now applied exclusively to the descendants of the people of St. Vincent transported to the Mosquito coast by the British Government, who are perfect negroes.†

St. Domingo.

All the objects exhibited from this island were collected by the late Sir Robert Schomburgk, who speaks of the Caribs of St. Domingo in the following terms:—"The last remnant of them, amounting to 300 or 400, retired under Enrique, the last of the Caciques of the island, to Boya, a village about thirty miles to the N.N.E. of the city. This wretched fragment of a once powerful nation soon vanished from the earth, and, in 1851, not a single pure descendant of the millions who, at the discovery, peopled St. Domingo existed. Their language lives only in the names of places, rivers, trees, and fruits, but all combine to show that the people who bestowed these names were identical with the Carib and Arawak tribes of Guiana. The figures carved of stone, and worked without iron tools, denote, if not civilisation, a quick conception, and an inexhaustible patience to give to these hard substances the desired forms. With respect to the age or epoch when the figures sculptured of stone were executed there is no tradition. It is remarkable that they are only found

* Fig. 1, p. 226.

† F. Boyle, 'A Ride across a Continent.' The Rev. Greville J. Chester, however, informs me that the Indians of Dominica, and the half-breeds of St. Vincent, are still called Caribs.—E. T. S.

where there is sure evidence that the Caribs inhabited or visited the place."*

A 40.

The specimens in this Case, Nos. 1 and 2, 5 to 7, and 9 to 12 are from St. Domingo. Nos. 1 and 2 are stone hatchets of simple form. Nos. 4 and 9 are stone hatchets ornamented with a ridge near the butt-end of the implement; this may have had reference to the mode of hafting. No. 7 is a stone hatchet with wing-like projections at the butt end; these may have assisted in securing the implement to its handle. Many of the stone hatchets found in South America have some provision towards the butt-end for securing them to the handle. Either a deep groove has been worked in the implement at the sides, or wing-like projections have been left at the sides. These implements had probably been bound to their handles by means of thongs, which were prevented from slipping by this provision. There is reason also for supposing that they were mounted like hatchets, at right angles to the handle, and not like adzes. In Mr. John Evans's Collection there is an implement with side notches, from South America; this specimen has a groove worked in the stone at the back of the butt-end, against which, no doubt, the handle rested. The mode of mounting stone implements by means of lateral notches appears, in North America, to be limited to arrow and spear-heads. Indeed, the presence of lateral notches is one of the characteristics of American flint arrow-heads. They are rarely, if ever, seen upon European flint arrow-heads. No. 5 is a grooved stone axe. Implements of this class were unquestionably mounted by passing a withe round the grooved part. Modern savages still adopt the same method, and country blacksmiths, plate-layers on railroads, and others may be seen using a hammer hafted in this simple manner. The jar to the hand is greatly reduced when a withe handle is employed. Savages sometimes place a piece of raw hide over the withe; this shrinks in drying, and effectually prevents the handle from slipping. Some ancient stone grooved axes are *polished* in the groove, as if from the slipping of the handle during use. No. 6 is a stone axe having indentations at the sides, but without a continuous groove carried round the implement. No. 10, Fig. 1, is a stone club of dagger-like form, ornamented at the end with the sculptured repre-

* Sir Robert Schomburgk, 'Ethnological Researches in Santo Domingo,' Report of the British Association, July, 1851, pp. 90—92.

sentation of a squatting human figure. This weapon is sixteen inches in length. Catlin figures two Chinook war-clubs, one made of copper, and the other of a bone of the sperm whale,* which are not unlike Fig 1. Nos. 11 and 12 are stone hatchets with an incised ornament upon one side, representing the upper portion of the human figure. See Fig. 2 (No. 12). It will be observed that the carving in No. 11 has been effected by "pecking;"† in No. 12 the tool marks have been removed by subsequent polishing. Two similar specimens are in the Christy Collection. Another is in the collection of Mr. Hodder M. Westropp, of Rookhurst, Cork; and another, said to have been found at Aigueperse, near Riom, Puy de Dome, France, is in the Clermont Museum. It differs from Figure 2 in being almost equally pointed at both ends. The sculptured figure upon it represents a human head wearing a conical cap; the bust and arms are not given. It is of serpentine, and measures about ten inches in length. Others are known to exist in both public and private collections. The sketch of a somewhat similar weapon is engraved upon a map of St. Domingo, published in 1731.‡ This specimen is described as having been found in an Indian sepulchre.

FIG. 1.

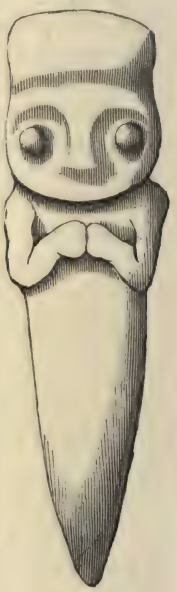


FIG. 2.

C 28.

All the objects in this Case were found in St. Domingo. Nos. 1 to 10 are stone pestles, used for pounding maize. Many of

* Catlin, 'North American Indians,' plate 210½, fig. *l*, described vol. ii., p. 113.

† A description of the process of "pecking" will be given when the implements from California are described.

‡ The map is entitled, 'L'Isle Espagnole sous le nom Indien d'Hayti, ou comme elle étoit possédée par ses habitants naturels lors de la decouverte, avec les premiers Etablissemens des Espagnols. Par le Sr. D'Anville, Geographe Ord. du Roi. May, 1731.' The figure of the implement has been copied in the 'Trans. Amer. Ethno. Soc.,' vol. iii., part 1, fig. 7 *a*.

these specimens are ornamented with carving; such as No. 6, Fig. 4; No. 8, Fig. 5; No. 10, Fig. 6.

FIG. 3.

FIG. 4.

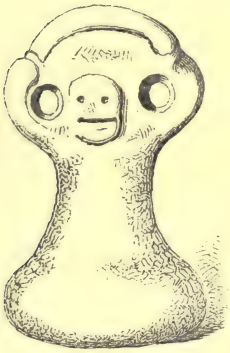


FIG. 5.

FIG. 6.

Schoolcraft mentions * that, among the modern tribes of North American Indians, the family name (*totem*) of the owner is sometimes carved on the end of the stone corn-crusher. It seems probable, however, that the sculptured figures upon the St. Domingo stone pestles were only intended for ornament. Sketches of objects, somewhat resembling Figs. 4 and 6, are

* 'Archives of Aboriginal Knowledge,' vol. iii, p. 467.

engraved upon a map of St. Domingo, published in 1731.* Some sculptured stone objects have been found by Don Miguel Rodriguez Ferrer, in the eastern department of Cuba, at a place called the *Junco*, in the jurisdiction of Baracoa, in the interior of a wood, at a depth of three feet below the surface of the soil. One of these objects has a general resemblance to Figs. 4 and 6; it is now preserved in the Royal University of Havana, and has been figured. †

No. 11 is a mealing stone. No. 12, Fig. 7, is a stone bowl with sculptured ornament upon the outside; it is five inches and a half in diameter, and may have been used as a mortar in which to bruise grain. No. 13 is a rude representation of the human face; it probably formed part of a stone mortar, or of a mealing stone.

FIG. 7.

Meat, as well as grain, has been reduced to powder in mortars, in order to render it serviceable for food; thus Strabo describes the use of mortars for pounding fish, by the fish-eaters who inhabited the coast of the present Beloochistan on the Arabian Sea. "The vertebræ (of whales) they use for mortars, in which they pound their sun-dried fish, and of this, with a little corn, they make bread." ‡

The stone pestle, No. 13, H 11, is a modern implement used on the north-west coast of America, for pounding meat or fish in order to convert it into pemican.§ The Indians of the

* These have been reproduced in the 'Trans. Amer. Ethno. Soc.,' vol. iii., part 1, fig. 7, *b* and *c*. They are described as 'Figures superstitieuses de Zémi ou Mabouya de la façon des anciens Insulaires.'

† Andrés Poey, 'Cuban Antiquities,' in the 'Trans. Amer. Ethno. Soc.,' vol. iii., part i., pp. 186, 187, fig. 1.

‡ Strabo, xv., 2, 2.

§ Some of the Indians east of the Rocky Mountains prepare pemican, *pimikehigan*, without the use of pestles. The meat is dried by the fire, and thus rendered brittle. It is then placed upon a buffalo hide, and reduced to a coarse powder with a flail. Melted fat is poured upon this pounded meat, and the whole is stirred until it becomes well amalgamated. It is pressed, while still warm, into bags made of buffalo hide. The mixture gradually cools, and becomes almost as hard as a stone. If the fat used in this process is taken from the parts containing the udder, the meat is called *fine pemican*. In some cases dried fruits, such as the prairie pear and cherry, are intermixed, which forms what is called *seed pemican*. The meat of one buffalo cow yields about half a

Columbia river dry salmon, of which they catch large quantities, by placing them upon wooden scaffolds and exposing them to the heat of the sun. When sufficiently dried, the fish are reduced to powder by bruising them between two stones; the pounded fish is then packed tightly in baskets made of rushes, lined with skins of salmon stretched and dried for the purpose, and in this state it will keep sound and sweet for several years.*

H 11.

Nos. 5 to 11 were found in St. Domingo. Nos. 5 to 7 are varieties of stone tables, standing on four legs, and used in bruising grain. No. 5, Fig. 8, is of the most simple form; it is eight inches and a half long, six inches and a quarter broad, and stands four inches and a quarter high.

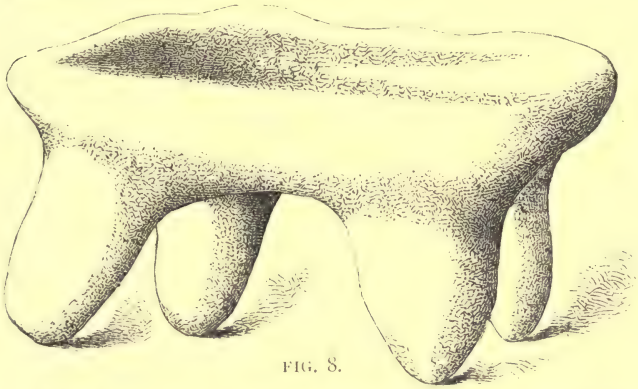


FIG. 8.

bag of pemican only. Much meat is dried and not converted into pemican. It is cut into long strips, about a quarter of an inch thick, and hung upon a kind of lattice work to dry. In a few days it is thoroughly dessiccated, and is then bent into proper lengths, and tied in bundles of 60 or 70lbs. weight. The meat of a buffalo cow makes no more than about three-fourths of a bundle of dried meat.—Schoolcraft, 'Archives of Aboriginal Knowledge,' vol. iv., p. 107. The word is spelt 'pemmican' in Bartlett's 'Dictionary of Americanisms,' Boston, 1860, p. 315. The authorities given for this spelling are Dunn's 'Oregon,' Back's 'Arctic Journal,' and Sir G. Simpson's 'Journey.' The word is written 'pemitigon' by Lewis and Clarke. 'To this were added pemitigon, a dish made of buffalo meat, dried or jerked, and then pounded and mixed raw with grease and a kind of ground potato, dressed like the preparation of Indian corn called hominy'—p. 63. Catlin says that pemican is buffalo meat dried very hard, and afterwards pounded in a large wooden mortar until it is nearly as fine as sawdust; it is packed in this dry state in bladders or sacks of skin. Pemican is usually eaten with marrow-fat, forming a substitute for bread and butter.—Catlin, 'North American Indians,' vol. i., p. 116.

* Lewis and Clarke, 'Travels to the Source of the Missouri River,' p. 365.

No. 11, Fig. 9, is a sculptured human head; it probably formed part of a stone table similar in form to No. 7. The ornamental carving at the back of the head is represented by Fig. 10. No. 8,

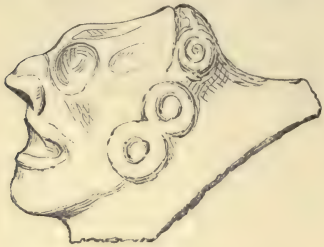


FIG. 9.

FIG. 10.

Fig. 11, and No. 9, Figs. 12 and 13, are stone pestles similar to those in Case C 28. A stone pestle, found in St. Domingo, and somewhat like Fig. 11, has been engraved.* No. 12, Fig. 14, is

FIG. 11.

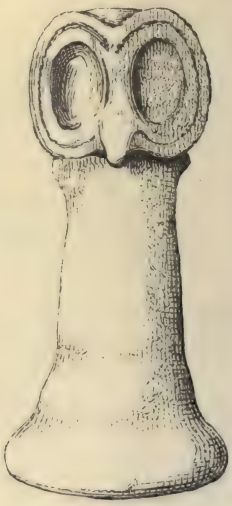


FIG. 12.

a modern stone pestle used for bruising grain by the natives of Marquesas; No. 14 is a similar specimen. When No. 14 was purchased, a circumstantial account was given of its having been found, 17th June, 1842, near Tremadoc, North Wales. It is, probably, a modern specimen from Melanesia. The Singhalese

* Andrés Poey, 'Cuban Antiquities,' in the 'Trans. Amer. Ethno. Soc., vol. iii., part i., p. 191, fig. 5.

use a thick heavy pestle of black stone for pounding rice; it is called Môlah, the Veddah name for an elephant.*

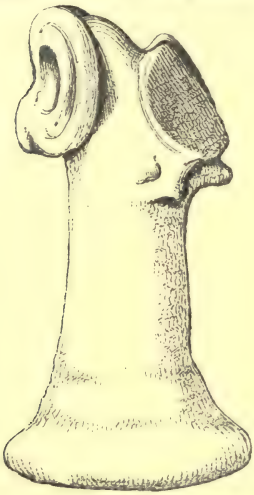


FIG. 13.

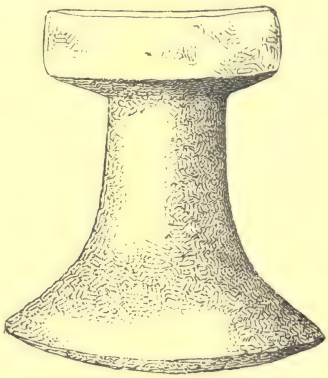


FIG. 14.

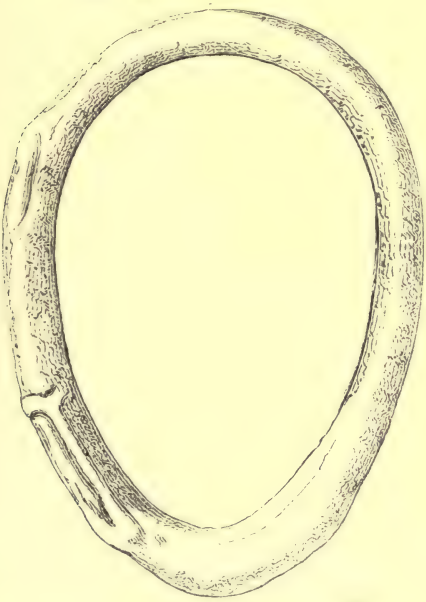


FIG. 15.

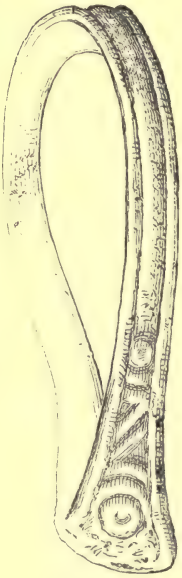


FIG. 16.

* J. Bailey, 'Wild Tribes of the Veddahs of Ceylon,' in the 'Trans. Ethno. Soc., London,' vol. ii., p. 317.

Ancient stone pestles of simple form are shown in Case H 13, Nos. 1 to 10 from Ohio, No. 11 from Virginia, Nos. 12 and 13 from New Jersey, and No. 14 from Florida.

As already mentioned, No. 13 is a modern stone pestle, from the north-west coast of America, used for pounding meat; it has been presented to the Collection by Sir Edward Poore, Bart.

No. 8 is a sculptured stone collar, Figs. 15 and 16. It is of an oval form, measuring ten inches and a half in its lesser, and fifteen inches and three quarters in its greater diameter.

An elliptical stone collar was exhibited to the Society of Antiquaries, January 21, 1869, by Mr. Josiah Cato, who made the following observations upon these objects:—

"The ancient stone ring which I have the honour of exhibiting to the Society of Antiquaries this evening is an object of extreme rarity in English collections, and of quite unknown use. It was brought to this country in December, 1865, by my friend, Mr. E. B. Webb, of 34, Great George Street, from the island of Porto Rico, where it was found.

"It is formed from a boulder of light-coloured volcanic stone, is seventeen inches and a half in its greater, and fourteen inches and a quarter in its lesser diameter. The elliptical perforation has a major axis of twelve inches and one-eighth, and a minor axis of eight inches and a quarter. The weight is twenty-five and a half pounds (avoirdupois).

"Externally, the ring has two distinct ornaments; one, at the end of the ellipse and the thickest part of the ring, is *chevronnée*, with nine incised chevronels. The other, on the side of the ellipse, may perhaps be intended to represent the ends of a hoop which have been laid together and bound by a ligature. This second ornament appears on other specimens found in the same island, but the chevronels are replaced by other designs. I am not aware that the human figure is in any case represented.

"The example before the society was exhumed from a considerable depth from the surface, near the top, but on the southern side of the *sierra*, or range of hills, which runs from east to west nearly throughout the length of the island. It is supposed to be the only specimen from this southern slope, but Mr. Webb saw several which had been found on the northern, anciently the more populous, side of the island. They included about five entire rings, and fragments of about as many others. They were all in the possession of one person, who would not

part with them, and were all which were then known to have been found in the island; but Mr. Franks has kindly pointed out to me that a similar ring is engraved in the 'Mémoires de la Société Royale des Antiquaires du Nord,' in a report by C. C. Rafn on the 'Cabinet d'Antiquités Américaines à Copenhague, 1858,' and that it is said to be from the island of Porto Rico.

"A similar ring, but of lighter proportions and more finished workmanship, is in the magnificent collection formed by the late Mr. Christy. It is from the island of St. Thomas, and may have been obtained by Mr. Christy, in exchange, from the Copenhagen Museum. Its internal diameters are thirteen, and eight and a half inches.

"The only other specimen known to be in this country belonged to the late Sir Robert Schomburgk. It was sold on 1st December, 1865, by auction at Stevens's, and is now in the museum formed by Mr. Blackmore, at Salisbury. Its internal diameters are twelve and a half, and eight and a quarter inches.

"Dr. Wilson, in his 'Prehistoric Annals of Scotland' (vol. i., p. 222), engraves two stone collars, which are somewhat like the specimens in the Blackmore and Christy Collections, and are said to have been found near the parallel roads of Glen-Roy. Judging only from the engraving, they are, however, very much more likely to have come from the Caribbean islands.

"With regard to the probable use or purpose of these rings I can give no information, but shall be very much obliged for any suggestion, or for hints as to any works, likely to contain such an account of the customs of the nations at the time of the Spanish invasion, as may afford a clue to the mystery.

"Such elaborate pieces of work in hard stone could not have been intended to serve either a temporary or a trifling purpose. They are all far too heavy for ordinary use, but yet not heavy enough to kill, or even to greatly torture the wearer, if we regard them as collars of punishment.

"Of the many suggestions I have yet received none seem applicable alike to each of the known examples, and I can only hope that my exhibition to-night may result in clearing all doubt on the subject."*

* 'Proceedings Soc. Antiquaries,' 2nd series, vol. iv., No. 5, pp. 215, 216. I can only repeat the hope expressed by Mr. Cato, that those persons who may be able to throw light upon the probable use of these interesting objects will give us the benefit of their reading and knowledge. I would also solicit information respecting the probable use of Nos. 1, 2, and 4, Case C 31, which specimens formed part of the late Sir Robt. Schomburgk's collection.—E.T.S.

C 31.

The objects in this Case were all found in St. Domingo. Nos. 1, 2, and 4 may have been used as anchors. No. 4 shows considerable wear near the drilled hole as if from its having been suspended with a cord. No. 3 is a stone which has been used for pounding maize. Similar specimens are shown from California, Case H 12, Nos. 6 to 9, and from the United States, Case C 33, Nos. 1 to 4.

The presence, in the Collection, of so many implements for crushing grain, from the West Indies and the mainland of America, may astonish some persons, who have been accustomed to regard the aborigines of the New World as hunters, and not as tillers of the soil. There is, however, some very interesting evidence of the indigenous character and origin of American agriculture.* Sir John Lubbock has remarked that —"American agriculture was not imported from abroad; it resulted from, and in return rendered possible, the gradual development of American semi-civilisation. This is proved by the fact that the grains of the Old World were entirely absent, and that American agriculture was founded on the maize, an American plant."†

It is also interesting to notice that the implements used by the aborigines for grinding corn in America differ from those used by prehistoric races in the Old World. The form of the aboriginal implement for converting grain into meal was, probably, as little an importation into the New World as was the grain itself. The writer of this Notice has not had the advantage of examining any large series of American mealing-stones, but he is under the impression that the *invention* of the quern never took place in America. Grain, throughout that vast continent, was either pounded in mortars, or reduced to a coarse powder upon some form of stone table; but no true quern,‡ consisting of two stones made to revolve against each other, appears, at any time, to have been in use among the aborigines of America. Of them it never would have been said that "Two women sat grinding at the mill;" this is purely an Old World idea of grinding; the phrase arose from the mode adopted in working the quern. Two women sat facing each other, with the quern placed between them; one grasped the handle and turned

* This branch of the subject will be noticed hereafter.

† 'Prehistoric Times,' pp. 233, 234.

‡ For a description of the various kinds of querns, see pp. 62—64.

the upper stone half way round; her companion's hand was ready to take the handle, and she turned it the other half way round, and so the work was continued. In America many plans for lightening the labour of grinding were adopted, such as suspending the stone pestle from the limb of a tree, which, acting as a spring, lifted the pestle;* but the simple idea of reducing grain to powder between two stones, the one being made to revolve upon the other, has apparently been overlooked. The grain-rubbers, in contradistinction to the querns of the Old World, are mere slabs of gritstone, hollowed from use, but perfectly unornamented; sculptured ornament is found only upon the later forms of quern. In America, however, as the *invention* of the quern appears not to have taken place, we naturally expect to find such elaborately finished grain-rubbers as the deeply hollowed stone mortars Nos. 1 to 5, Case H 12, and stone tables, covered with incised ornamentation, such as Nos. 1 to 3, Case C 32.

Barbados.

The specimens exhibited from Barbados have been presented to the Collection by the Rev. Greville J. Chester, who has kindly furnished the following information respecting them:—"In Barbados there is no hard stone, nothing harder than coralline limestone; the aborigines therefore were obliged to import *hard* stone implements and weapons from the other islands, or from the main continent of South America. For ordinary purposes, however, they used implements made of various kinds of marine shells, and of the *fossil* shells from the limestone. These shell implements vary in length from one and a half to six and a half inches; some in my possession are beautifully formed. In the commonest type the natural curve of the shell formed the handle. Discs and beads made of shell, and large quantities of pottery, in a fragmentary state, have been found associated with the shell implements. The use of an implement somewhat resembling a hone has not been satisfactorily ascertained, only one specimen out of the considerable number which have passed through my hands being worn down by use.† The large number of implements discovered under rock-shelters, and in gullies, proves the existence of a large native population in Barbados, and as shell hatchets are not

* Schoolcraft, 'Archives of Aboriginal Knowledge,' vol. iv., p. 175.

† This specimen has been presented by the Rev. Greville Chester to the Christy Collection.

found in the other West Indian Islands, it is clear that they are of purely local origin. In the parish of St. James several cart-loads of shell implements were found lying together; they were carried away to macadamise a road. Near the chapel of St. Luke, in a small gully, at the very centre of the island, I picked up seven shell implements in the space of ten minutes, as well as a quantity of pottery. The favourite spots for the habitation of the shell-workers seem to have been under rock-shelters, at the entrance of caves in the limestone rocks, and upon the sloping sides of the numerous 'gullies' which form the most characteristic feature of the scenery in Barbados. 'Indian river' in St. Michael's parish, the neighbourhood of the fresh-water springs on the borders of St. Michael's and St. James's, and the springs on the Codrington College estate in St. John's, appear all to have been centres of population. I have several well-made implements, of hard green and black stone, found in Barbados; one of these is only one inch and a quarter long. I have also a small and beautifully formed implement in the shape of a knife, made of yellowish alabaster, and a kind of stamp of the same material."

Mr. Greville Chester has presented a series of shell implements, found in Barbados, to the Christy Collection; he also exhibited a series of these objects at the monthly meeting of the members of the Archæological Institute, March, 1868.* Two shell implements brought from Barbados by Dr. Bovell, and presented by him to Dr. Daniel Wilson, have been figured.†

A 41.

The specimens Nos. 1 to 19 in this Case were found in various parts of the island of Barbados. Nos. 3, 5, 6, 12 and 18 are pieces of shell, probably intended to be made into implements. Nos. 1, 2, 4, 5, 7 to 11, 14 and 17, are shell hatchets. The form of these implements has in part been determined by that of the material employed. Nos. 1, 2, 8, 9, 10 and 14 are hollow on one side, and have a gouge-like appearance. The hollow, however, is natural, and in no case has it been extended, by artificial rubbing, to the cutting edge. A comparison of these specimens with the flint gouges from Denmark, in Case A 38, will show

* 'Archæological Journal,' vol. xxv., p. 169.

† Wilson, 'Prehistoric Man,' vol. i., pp. 208, 209, fig. 6.

that the Barbados implements are not true gouges, but are to be classed as hatchets.*

No. 7 illustrates this, for it is of the gouge-like type but is *not* hollowed. No. 11 is of quite a different type; it is flat both on the upper and the under surface, and in form resembles many of the ordinary stone hatchets. Stone implements having a similar section to the ordinary type of the Barbados shell implements are uncommon. No. 21, Case A 34, from Quedlinburg, Prussia; No. 13, Case A 29, from France; No. 14, Case A 44, from Ohio, U.S.A., and No. 23, Case A 42, from Upper Canada, have this section; these implements are flat on one surface, probably the under side when mounted, or when used in the hand, and are rounded on the other surface like ordinary stone hatchets. Nos. 4 and 17 differ from the other shell hatchets in being nearly equally broad throughout their length; all the others taper away from the cutting end of the implement. No. 4 has the natural hollow of the shell on the under surface. No. 17 is flat on the under surface. The edge of No. 8 is mnch blunted from use. No. 1 was found on the Codrington estate, parish of St. John (Barbados), in 1868; No. 2 was found near Codrington College, in 1867; No. 4 was found below Mount Ararat (Barbados), parish of St. Michael; No. 7 was found in the parish of St. Andrew; Nos. 8 to 11, in the parish of St. Luke; No. 14 was found at Conset Point (Barbados); No. 17, in the parish of St. James.

Nos. 1 and 2, Case A 54, are modern shell hatchets, from Melanesia. The natural form of the shell determined the shape of No. 1, as with the Barbados implements. Nos. 2 and 9, Case E 2, are mounted shell adzes, from Melanesia. No. 21, Case C 40, is a mounted shell adze, from the Society Islands.

These specimens show that the use of shell for implements was not limited to the ancient Caribs of Barbados. An adze with a shell blade, from the Friendly Islands is preserved in the British Museum. In the Christy Collection there is an adze with a shell blade from New Guinea, and another from New Caledonia.

A shell hatchet in the possession of M. Damour was obtained from the island of Oéland, Caroline Archipelago. The natives mount them in "herminette" and place them in a curved handle

* I have used the term *hatchet* throughout the 'Guide,' for all stone implements of a simple wedge-like form. Many, doubtless, were used in the hand; others were mounted as hatchets, but, probably, more frequently as adzes. The term *axe* has been applied exclusively to grooved or drilled stone implements; these were mounted at right angles to the handle.—E. T. S.

of the form of an S—the implement is not used as a weapon, but as a tool.*

Shell adzes, attached to the original handles, in use by the Kingsmill islanders, are preserved in the Museum of the Smithsonian Institution, Washington, U.S.A. The use of shell adzes by the natives of the north-west coast of America has been already mentioned.†

The Indians who formed the shell-mounds on the banks of the St. John's River, East Florida, appear to have been in constant communication with the coast, and to have carried marine shells into the interior, some of which they converted into implements. One of the most common forms is made of a triangular piece cut from the shell of *Pyrula carica*, so as to comprise a portion of the rostrum, serving as a handle, and a portion of the swelling part of the body, which is the useful part of the tool. The sides and apex are smoothed and rounded, while the base is regularly curved and ground to an edge like that of a gouge, but with the bevel on the inside. A specimen presented to Dr. Wyman by Dr. H. P. Bowditch, and obtained by him from the shell-mound at Old Enterprise, on the north-eastern shore of Lake Monroe, East Florida, shows that the mode adopted in working the material was to cut a groove partly through the shell, and then the fragment was broken off by a blow. Several hatchets made of the shell of the *Strombus gigas* have been found in the shell-mounds of the St. John's River.‡

Nos. 13, 15, and 19 are specimens of the pottery found in Barbados, associated with the shell implements. No. 13 was found in the Chapelry of St. Luke, and No. 15 at Conset Point. Nos. 13 and 15 are portions of the rims of rather large vessels; they have an indented ornament upon them, produced by removing a portion of the clay, whilst still in a plastic state, with the point of the thumb; the mark of the thumb-nail is very distinct. A similar kind of ornament may be seen upon the pottery No. 5, D 12, from the Highfield pit-dwellings, near Salisbury. No. 16 is a polished hatchet of greenstone, found in the parish of St. James (Barbados).

* 'Matériaux,' *l.c.*, vol. ii., p. 385.

† See page 68.

‡ Dr. Wyman, 'An Account of the Fresh-water Shell-heaps of the St. John's River, East Florida.' Salem, Mass., 1868, pp. 17, 18, reprinted from the 'American Naturalist,' vol. ii., nos. 8 and 9.

A 41.

ST. VINCENT.

No. 20 is a polished hatchet of greenstone, found in Buccament Valley, Island of St. Vincent; it has been presented to the Collection by the Rev. Greville J. Chester.

A 40.

JAMAICA.

Dr. Wilson mentions* that the island of Jamaica has furnished a peculiarly abundant series of examples of the stone and flint weapons and implements of its ancient inhabitants. The only specimens from Jamaica, in the Collection, are Nos. 3, 13, and 14. No. 3 was found at Richmond Hill, in the parish of St. James. It was presented by the late Mr. G. Witt, F.R.S. Nos. 13 and 14 were given by Mr. Newell V. Squarey.

The following letter† from Lieutenant Alwin S. Bell, 3rd West India Regiment, upon the discovery of stone hatchets in Jamaica, was read at a recent meeting‡ of the members of the British Archæological Association, and has been published in their Proceedings. §

"I noticed one day at a friend's house, lying on a window-ledge near some water jars, an ancient stone chisel or axe, similar to those found in Britain. It had been dug up, my friend said, some years ago in the mountains here, and that was all he could tell me about it. From further inquiries made, I found the negroes to be acquainted with these ancient stone implements, and that they used them to keep water cool in their jars.

"I have since obtained several, in all about thirty (mostly from the old black people, formerly slaves), in the country districts. These have been found at various periods, but chiefly during the slave time, when the greater portion of the island was under cultivation. The negroes call them thunder-bolts, and believe they fall from the clouds during the heavy tropical storms to which the island is subject. They have also a curious tradition that these ancient remains rise to the surface

* 'Prehistoric Man,' vol. i., p. 215.

† The letter is dated Falmouth, Jamaica, 28th April, 1868.

‡ Dec. 9th, 1868.

§ 'Ancient Implements of Stone lately found in Jamaica,' published in 'Journ. Brit. Archæo. Association,' Dec. 31, 1868, pp. 403, 404.

of the ground once in every seven years.* Those in my possession are, with some exceptions, nearly all shaped similarly to the figure (No. 4) given in *The Celt, the Roman, and the Saxon,* at page 69, and said to be a copy of the original preserved in the museum of the Society of Antiquaries.

"They vary considerably in size, and are all formed of very hard stone. Some are quite perfect, but the greater part of those that I have seen and collected are chipped, more or less, at the broad part, or cutting edge. One or two appear to be of a different type from the rest, being very narrow, though still possessing a chisel end. The largest implement in my own Collection measures nine inches in length and three inches and a half across the broad end. The smallest I have is made of greenstone, and measures only two inches by an inch and a quarter.

"My friend told me that his specimen at first was chipped at the end, and that he employed a labourer to grind it down even, which had much *improved* it! but that the man complained of its being a very hard job, and that it had nearly spoilt his grindstone."

A 40.

WEST INDIES.

No. 8 is a stone implement, perhaps used as a club; it has two deep grooves on one side, and marks of wear above the grooves, a drilled hole has been commenced on the under surface. This specimen formed part of the Brackstone Collection. It has been figured,† and described as having been found in the county of Westmeath, Ireland. It is, however, probably of Carib workmanship, and obtained from one of the West Indian islands, or from South America.

* See remarks upon the general belief that stone hatchets are thunderbolts, at p. 89. These "thunderstones," which penetrate into the earth as far as the highest church steeple is long, are supposed, according to a popular Scandinavian belief, to rise towards the surface every time it thunders, and at the expiration of seven years again to appear upon the earth. Thorpe, 'Northern Mythology,' vol. i., p. 54, note; vol. iii., p. 57.

† 'Archæological Journal,' vol. viii., p. 422.

ABORIGINAL POTTERY OF AMERICA.

As the series of American pottery in the Collection is large and highly illustrative, it has been thought desirable to give some general information upon the subject before describing the separate groups in detail.

"The first efforts of the aboriginal American potter appear to have been directed to the production of vessels of the form of the natural objects around him, such as gourds, fruits, or shells. The clay used had frequently an admixture of sand and pulverised shells. These vessels were, possibly, actually moulded upon the gourd or other object, in sections, and luted together whilst yet soft. After drying they were burnt to different degrees of hardness. I have never found any evidence of the use of the wheel in the manufacture of aboriginal American pottery. When a large vessel was attempted to be made, it was moulded in the inside of a basket, or mat, for we find the impression of the plait on the outside of the vessel, whilst the inside is smooth. The earlier vessels were made without a flat bottom or feet. The specimens in my Collection from the United States are, for the most part, round at the bottom, sometimes slightly flattened, whilst those from Mexico are either flat at the bottom or supported by four feet. On the other hand, those from Central America are either round at the bottom or are supported by three feet, the tripod being the most steady support. The vessels from Peru are generally flat at the bottom. Aboriginal American pottery was ornamented either with rude lines or figures scratched upon the clay when in a wet state, or with figures cast and then attached to the vessel before it had dried. Some of the pottery is ornamented with different colours."*

Even the present race of Indians make pottery by hand, without the wheel. Mr. Squier says that the water jars and

* Extract from a manuscript catalogue sent by Dr. Davis, with his Collection, to Mr. Blackmore.

other vessels in ordinary use in Nicaragua amongst all classes, are still made by the Indians. They are formed by the hand, without the aid of the potter's wheel, and are variously and often elaborately coloured and ornamented, baked, and, when intended for purposes requiring it, are partially glazed.*

Schoolcraft remarks, no trace has been discovered of that ancient and simple invention, the potter's wheel. All the pottery of America was made by hand, from the most elaborate vases of Peru and Mexico, to the rude "akeeks" used by the natives of the Mississippi Valley, and by the hunter tribes of New England. †

The Indian tribes of the United States, who formerly inhabited both sides of the Alleghany Mountains and the whole Mississippi Valley, extending north to the Great Lakes, and reaching south around the northern coasts of the Gulf of Mexico, all, so far as known, preserve traditions which point either south, south-west, or due west, as their ethnographic starting point. They appear to have brought with them, and to have propagated northwardly, the knowledge of two most important arts, the manufacture of pottery, and the cultivation of the maize.‡ They made cooking pots and other vessels of coarse clay, tempered with silex. This art extended also quite into the northern parts of New England, and to the banks of Lake Superior, where it ceases.

The Indian tribes of the broad, elevated, summit of the Rocky Mountains never raised corn, nor had they the art of pottery. Frémont found no traces of either till he passed entirely through them, or went into the latitudes of California; De Smet noticed neither in his missionary journeys between the sources of the Missouri and the northern branch of the Columbia. The Shoshonees, or Snake tribe, who dwell in the arid valleys about the area of Fort Hall, in the southern pass, do not make pottery: but boil their fish, and the flesh of the few animals of those districts, in pots made of osiers, or of small roots and fibres dug from the ground.§ On the contrary, the history of the track of migration of all the known tribes of the low and swampy latitudes of the Mississippi Valley and of the Atlantic coasts, is distinctly traced by the fragments of pottery which mark the

* 'Travels in Central America,' vol. i., p. 288.

† 'Archives of Aboriginal Knowledge,' vol. vi., p. 611.

‡ The subject of the cultivation of the maize will be considered in another part of the 'Guide.'

§ *Vide* N. J. Wyeth, Doc. Ind. Off. Int. Dept.

sites of their ancient villages. Nothing is, indeed, more characteristic of these village sites.*

The pottery found in the low mounds of the Gulf coasts of Florida appears to hold a middle place between the more elaborate productions of Mexico and the rude attempts of the hunter tribes of the north-western and north-eastern districts of the United States. Some of the earthen vessels found in the mounds of Florida are quite perfect, with the exception of a hole, made, it is thought purposely, in the bottom. This hole may have been intended to unfit the vessels for use and so to insure their being left undisturbed in the mound.† The pottery is all hand-made, and much of it has been well fired. It is ornamented with incised lines and dots, the lines are often curved and frequently interlace each other, the dots usually fill up the interspaces of the pattern. A few of the vessels are ornamented with the heads of birds in relief. Schoolcraft has expressed the opinion that among the American tribes the potter's art was practised by but few individuals. No mere hunter or warrior could, he says, drop his weapons, at any time, and set to work to fabricate pottery. In another branch of industry, a subdivision of labour did exist, for, according to Chippewa tradition, certain men were called "Makers of Arrowheads."‡ They selected proper stones and devoted themselves to this art, taking from the hunters skins and flesh of animals in exchange for their stone arrow-heads. This is related by the Algonquins.§

* Schoolcraft, 'Archives of Aboriginal Knowledge,' vol. i., p. 65.

† The date of the construction of these mounds is, probably, not earlier than about the 12th century. They are not of the gigantic size of the mounds in the Mississippi Valley, being usually only from 30 to 50 feet in diameter, and from 12 to 18 feet in height. They are sepulchral, and the interments have been by inhumation. In one instance "the skeleton of a very large person was found in a horizontal position, with a skull of great lateral expansion. Around it were the bones of others, all in a sitting posture." In another mound, "two layers of skeletons were found, with their heads inclined to the centre—the heads being raised, and the feet forming the extremities of radii." The mounds are circular and orbicular, and are surrounded with a shallow trench, caused apparently by the removal of soil for the construction of the mound. Schoolcraft, 'Archives of Aboriginal Knowledge,' vol. iii., pp. 77, 78.

‡ 'Algic Researches.' See also p. 82, where it is stated, on the authority of Catlin, that "only certain adepts among the Apaches are able or allowed to make flint arrow-heads."

§ Schoolcraft, 'Archives of Aboriginal Knowledge,' vol. iii., pp. 75—82, plate 45, figs. 1—12.

Among the Iroquois, however, pottery was made by the women.* Squier and Davis also say that the labour of kneading the clay and of forming the vessels among the existing Indian tribes, devolves upon the women. Pounded shells, quartz, and sometimes coarse sand from the streams, are mixed with the clay, in order to enable the vessel to stand the fire.

As regards ancient pottery, a greater degree of skill was displayed by the Indians along the Gulf than by those on the upper waters of the Mississippi and on the lakes. Their vessels were generally larger, more symmetrical, and of a superior finish. They were moulded over gourds and other models, and baked in ovens. In the construction of large vessels, it was customary to model them in baskets of willow or splints, which, at the proper period, were burned off, leaving the vessel perfect, and retaining the somewhat ornamental markings of the mould. Some of the pottery found on the Ohio seems to have been modelled in bags or nettings of coarse thread or twisted bark. These practices are still retained by some of the remote western tribes. Many specimens of this description of pottery are found with the recent deposits in the mounds. They are identical, in every respect, with those taken from the known burial-grounds of the Indians; and though generally of rude workmanship, they are not destitute of a certain symmetry of shape and proportion.

The mound-builders of Ohio attained to a considerable degree of excellence in the manufacture of pottery. Various, though not abundant, specimens of their skill have been recovered. These far exceed anything which the existing tribes of Indians are capable of producing. No perfect vessels have been recovered from the mounds; those that have been found occur only in the "altar" or "sacrificial" mounds, and always in fragments. Pieces, probably, belonging to about a dozen vessels of medium size were found in the long mound, No. 3, "Mound City." The mound pottery is made of fine clay, which, in the more delicate specimens, appears to have been worked nearly pure, possessing a very slight silicious intermixture. Some of the coarser specimens, although of more elegant forms, resemble the Indian ware already described, pulverized quartz being intermixed with the clay. Others are tempered with a salmon-coloured mica in small flakes, which gives them a ruddy and rather brilliant appearance; the mica was, perhaps, introduced with

* 'Notes on the Iroquois.'

some view to ornament as well as utility.* None of the mound pottery appears to have been glazed; although one or two vessels, either from baking, or the subsequent great heat to which they were subjected, exhibit a slightly vitrified surface.†

The Indians of the Amazon glaze their pottery by applying a resinous gum after they have warmed the vessel over the fire. The Nicaraguan pottery is glazed in a similar manner.‡

Mr. Charles Rau, of New York, has brought together much valuable information upon the subject of the aboriginal pottery of America.

"In former times," he says, "when the aborigines of America were still in possession of their own lands, and their mode of living had not been changed by the intrusion of Europeans, the art of pottery was practised by them to a considerable extent. This branch of industry lost, however, much of its importance among the Indians so soon as they discovered the superiority of the vessels of metal, which they obtained in traffic with the whites; and the durable kettle of iron or copper soon replaced the fragile and far less serviceable cooking utensil of clay. The beginning of the decline of this aboriginal art is, therefore, of an early date, and at the present time it may be considered as almost, if not entirely, extinct among the tribes still inhabiting the territory of the United States, excepting some in New Mexico and Arizona, who have not yet abandoned the manufacture of earthenware. As late as in 1832, when Catlin visited the nations of the Upper Missouri, he found the Mandans making pottery, but it is probable that vessels of clay are no longer made in those regions.

"The Iroquois, of New York, those survivors of the once powerful Confederation who have escaped the fate of being driven toward the setting sun, and are still permitted to dwell upon their native soil, have ceased long ago to fabricate earthen vessels. So I am informed by Dr. Peter Wilson,

* "The present Chilenoes are good potters for common ware; they introduce a considerable quantity of earth and sand, containing abundance of yellow mica, and their vessels sometimes hold as much as seventy gallons or more. They are of great thinness, lightness, and strength."—Schmidtmeyer, 'Chile,' p. 117. Some specimens of African pottery contain numerous flakes of mica. See Nos. 27—29, Case E 12, from the Niger district.

† Squier and Davis, 'Ancient Monuments of the Mississippi Valley,' pp. 187—189.

‡ Squier, 'Travels in Central America,' vol. i., p. 288. W. H. Edwards, 'A Voyage up the Amazon,' p. 114.

De-jih-non-da-weh-hoh, grand chief of the Six Nations of New York. 'The manufacture of pottery,' says my correspondent, 'has long since been discontinued among our people; like most other utensils, clay vessels have been superseded by utensils of the manufacture of the race who introduced among us the implements, which are more durable and convenient. Such implements and other articles used among us only remain, or are being manufactured, as are not superseded by articles which the ingenuity of the pale face replaces.' The same remark can probably be applied to the other tribes east of the Rocky Mountains.

"That the fabrication of earthenware was once carried to a great extent among the Indians, is shown by the great number of fragments which lie scattered over the sites of their former villages and on their camping-places; but they are, perhaps, nowhere in this country more numerous than in the 'American Bottom,' a strip of land which extends about one hundred miles along the Mississippi, in Illinois, and is bounded by the present bank of that river and its former eastern confine, indicated by a range of picturesque wooded hills and ridges, commonly called the 'Bluffs.' This bottom, which is on an average six miles wide and very fertile, was formerly the seat of a numerous indigenous population, and abounds in tumular works, cemeteries, and other memorials of the subdued race. Among the lesser relics left by the former occupants are numerous fragments of earthen vessels. These fragments are, however, mostly small; according to my experience, entire vessels are not found on the surface; they are only met with in the ancient mounds and cemeteries.

"About six years ago, while living in the West, I was much gratified by the discovery of a place in the American Bottom where the manufacture of earthenware had evidently been carried on by the Indians. The locality to which I allude is on the left bank of the Cahokia creek,* at the northern extremity of Illinois-town, opposite St. Louis. At the point just mentioned, the bank of the creek is somewhat high and steep, leaving only a small space for a path by the side of the water. When I passed there for the first time, I observed, scattered over the slope or protruding from the ground, a great many pieces

* This creek runs in a southwardly direction through Madison county and a part of St. Clair county, and empties into the Mississippi four miles below St. Louis, near the old French village of Cahokia.

of pottery of much larger size than I had previously noticed elsewhere, some being as large as a man's hand, and others considerably larger. Upon examination, I found that the material consisted of a grayish clay mixed with pounded shells. A great number of old shells of the *Unio*, a bivalve which inhabits the creek, were lying about, and their position induced me to believe that they had been brought there by human agency rather than by the overflowing of the creek. My curiosity being excited, I continued the investigation, and discovered at the upper part of the bank an old ditch of some length and depth, and overgrown with stramonium or jimson weed. Upon entering this excavation, I saw near its bottom a layer of clay, identical in appearance with that which composed the fragments of pottery. The excavation had unmistakably been dug for the purpose of obtaining the clay, and I became convinced that the fabrication of earthen vessels had been carried on by the aborigines at this very spot. All the requisites for manufacturing the vessels were close at hand; the layer of clay furnished the chief ingredient, and the creek not only supplied the water for moistening the clay, but also harboured the mollusks whose valves were used in tempering it.

"Whenever pottery is made, some of the articles will crack during the process of burning, and this will happen more frequently when the method employed in that operation is of a rude and primitive character, as it doubtless was in the present case. The sherds found at this place may, therefore, with safety be considered as the remnants of vessels that were spoiled while in the fire, and were then thrown aside as useless.

"I did not succeed in finding the traces of a kiln, and it is probable that the vessels were merely baked in an open fire, of which all vestiges have been swept away long ago. The occurrence of the broken pottery was confined to a comparatively small area along the bank, a space, as far as I can recollect, not exceeding fifty paces in length. They were most numerous in the proximity of the old digging. Farther up the creek I saw another excavation in the bank, of much smaller dimensions, and likewise dug for obtaining clay. Among the shells and sherds I noticed many flints which had been fashioned to serve as cutting implements; they were also, perhaps, used in tracing the ornamental lines on the vessels, or in smoothing their surfaces.

"I did not find a single perfect specimen at this place, but

the great variety of fragments enabled me to determine the original shape of many of the vessels. The rim was usually formed into a lip and turned over, in order to facilitate suspension; sometimes, however, it was cut off abruptly. Some of the vessels—more especially the smaller ones—were provided with ears,* others had the outer rim set with conical projections or studs, both for convenience and ornament; and a few of the fragments exhibit very neatly indented or notched rims. In size these vessels varied considerably; some measured only a few inches through the middle, while the largest ones, to judge from the curvature of the rims, must have exceeded *two feet in diameter.* The bottom of the vessels was rounded or convex. I did not find a single flat bottom-piece. Flat-bottomed vessels were, however, made by the Indians. The appearance of the fragments indicates that the earthenware was originally tolerably well burned, and the fracture exhibits in many instances a reddish colour.

"The thickness of the fragments varies from one-eighth to three-eighths of an inch, according to the size of the vessels, the largest being also the thickest. In each piece the thickness is uniform in a remarkable degree; the rims are perfectly circular, and the general regularity displayed in the workmanship of these vessels renders it almost difficult to believe that the manufacturers were unacquainted with the use of the potter's wheel. Such, however, was the case. I have already mentioned that the clay used in the fabrication of this earthenware is mixed with coarsely pulverised unio-shells from the creek; a few of the smaller bowls or vases seem to consist of pure clay. The vessels were covered on the outside, and some even on the inside also, with a thick coating of paint, either of a black, dark brown, or beautiful red colour, and in some fragments the latter still retains its original brightness. Only *one* colour, however, was used in the painting of each article. It is evident that the colouring preceded the process of baking, and the surfaces thus coated are smooth and shining, the paint replacing to a certain extent the enamel produced by glazing.

"That the aboriginal potters on the Cahokia creek did not neglect the decorative art in their manufactures is shown by the

* I possess a small food vase of this shape, which was taken out of an old Indian grave on the "Bluffs," near French village, six or seven miles east of Illinoistown. It was, perhaps, made at the very place which I have described.

ornamental lines traced on the surface of their ware. The simplest form of ornamentation consists in straight lines running around the vessel parallel to the rim; but chevron, spiral, and circular lines were used for ornamenting some of the vessels. In some instances the *inside* only was ornamented. The lines are mostly drawn with great regularity, and are sometimes one-eighth of an inch wide, with a corresponding depth. I obtained, however, from the deposit at the Cahokia creek one small fragment, which exhibits a much higher degree of skill in the art of decoration than any of the others found at the same place. This specimen is about three-sixteenths of an inch thick, and consists of clay, with an admixture of pulverised granite, the components of which—quartz, feldspar, and mica—can be plainly distinguished in the fracture. It is well baked, and of a light-gray colour. The ornamental lines and notches are impressed, or, perhaps, scooped out, with the greatest accuracy, and the vessel, when complete, must have presented a very good specimen of aboriginal American pottery. Having seen the best specimens of 'mound' pottery obtained by Messrs. Squier and Davis, I do not hesitate to assert, that the clay vessels fabricated at the Cahokia creek were in every respect equal to those exhumed from the mounds of the Mississippi valley; and Dr. Davis himself, who has examined my specimens, concurs in this opinion.

"One of the methods employed by the Indians in the manufacture of earthenware was, to weave baskets of rushes or willows, similar in shape to the vessels they intended to make, and to coat the inside of these baskets with clay to the required thickness; the baskets, after being destroyed by the fire, left on the outer surface of the vessels peculiar impressions, resembling basket-work, which produce a very pleasing effect, and to a certain extent are a substitute for ornamentation.*

"With this method the potters on the Cahokia creek were acquainted, for I found a few pieces of their ware bearing the marks just mentioned. This sort of pottery, however, is not mixed with pounded shells, but with sand, and is much better baked than the other kind; it is of a pale-red colour, and is not painted.

"The question now arises, who were the makers of this pot-

* Bartram describes a vessel of this kind which he extracted from a shell-mound on one of the islands near the coast of Georgia.—'Bartram's Travels,' Dublin, 1793, p. 6.

tery? I believe them to have been the Cahokia Indians, whose descendants dwelt, until a comparatively recent period, on the banks of the creek that still bears the name of their tribe. Concerning the antiquity of the manufacture I am not prepared to give an estimate. Only a hundred years may have elapsed since the vessels were made, yet it is also possible that they are much older. The appearance of the fragments rather indicates a modern origin.

"The writings of early, and even of comparatively modern, authors on North America are not deficient in particulars relating to the art of pottery among the natives. According to their statements, those tribes were most advanced in the manufacture of earthenware who inhabited the large tracts of land formerly called Florida and Louisiana, which comprise at present the southern and south-western States of the Union; and their testimony is fully corroborated by the character of such specimens of pottery from those parts as have escaped destruction, and are preserved in the Collections of the country.* The Natchez, on the Lower Mississippi, perhaps the most civilised among the North American Indians, and supposed to be related to the Aztecs, were skilful potters. So we are told by the anonymous Portuguese gentleman, called the 'Knight of Elvas,' who, towards the middle of the sixteenth century, accompanied De Soto on his adventurous expedition through a great portion of the North American continent, and became afterwards the chronicler of that bold Spaniard's exploits. In the province of Naguatex, he states, clay vessels were made, 'which differed very little from those of Estremoz or Montemor.' These two towns in Portugal are noted for their earthenware.† Du Pratz mentions

* "In some of the southern States, it is said that the kilns in which the ancient pottery was baked are now occasionally to be met with. Some are represented still to contain the ware, partially burned, and retaining the rinds of the gourds, &c., over which they were modelled, and which had not been entirely removed by the fire. In Panola county, Mississippi, are found great numbers of what are termed pottery kilns, in which are masses of vitrified matter, frequently in the form of rude bricks, measuring twelve inches in length by ten in breadth. It seems most likely that these kilns are the remains of the manufactories of the later tribes—the Choctaws and Natchez." —'Ancient Monuments of the Mississippi Valley,' Washington, 1848, p. 195.

† 'Virginia Richly Valued, by the Description of the Maine Land of Florida, her next Neighbour, &c. Written by a Portugall Gentleman of Eluas, emploied in all the Action, and translated out of the Portugese by Richard Haklvyt, London, 1609' (reprint of 1812, supplement), p. 750.

the 'Ecore Blanc,' on the Mississippi, as one of the localities where the Natchez obtained clay for their pottery, and likewise ochre to paint it. 'When coated with ochre,' he says, 'it becomes red after the burning.' Elsewhere in speaking of the manufacture of clay vessels by the natives of Louisiana, the same author remarks: 'The women make pots of an extraordinary size, jars with a small opening, bowls, two-pint bottles with long necks, pots or jugs for preserving bear oil, holding as much as forty pints, and, finally, plates and dishes in the French fashion.'*

"Dumont, who likewise describes the manners of the people inhabiting the extensive country formerly called Louisiana, has left a more minute account of the method they employed in making earthenware. He says: 'After having amassed the proper kind of clay and carefully cleaned it, the Indian women take shells which they pound and reduce to a fine powder; they mix this powder with the clay, and having poured some water on the mass, they knead it with their hands and feet, and make it into a paste, of which they form rolls six or seven feet long and of a thickness suitable to their purpose. If they intend to fashion a plate or a vase, they take hold of one of these rolls by the end, and fixing here with the thumb of the left hand the centre of the vessel they are about to make, they turn the roll with astonishing quickness around this centre, describing a spiral line; now and then they dip their fingers into water and smooth with the right hand the inner and outer surface of the vase they intend to fashion, which would become ruffled or undulated without that manipulation. In this manner they make all sorts of earthen vessels, plates, dishes, bowls, pots, and jars, some of which hold from forty to fifty pints. The burning of this pottery does not cause them much trouble. Having dried it in the shade, they kindle a large fire, and when they have a sufficient quantity of embers, they clear a space in the middle, where they deposit their vessels and cover them with charcoal. Thus they bake their earthenware, which can now be exposed to the fire, and possesses as much durability as ours. Its solidity is doubtless to be attributed to the pulverised shells which the women mix with the clay.'†

* Du Pratz, 'Histoire de la Louisiane,' Paris, 1758, vol. i., p. 124, and vol. ii., p. 179.

† Dumont, 'Mémoires Historiques sur la Louisiane,' Paris, 1753, vol. ii., p. 271, &c.

"Adair, more than a century ago, a trader with the tribes who occupied the southern portion of the present Union, confines himself to the following remarks:—'They make earthen pots of very different sizes, so as to contain from two to ten gallons; large pitchers to carry water; bowls, dishes, platters, basins, and a prodigious number of other vessels of such antiquated forms as would be tedious to describe and impossible to name. Their method of glazing them is, they place them over a large fire of smoky pitch-pine, which makes them smooth, black, and firm. Their lands abound with proper clay for that use.'*

"Loskiel, who describes the manners of the Delawares and Iroquois, states that they formerly made kettles and cooking-pots of clay, which they mixed with finely pounded shells, and burned until they became black throughout. Quite large pieces of their pots, he says, in which the pounded shells could still be seen, were often found in places where the Indians had dwelt in ancient times; but after the arrival of the Europeans very light kettles of brass had generally been introduced among them.† Thus we see that these tribes began at an early period to neglect the manufacture of clay vessels.

"A very good account relating to the art of pottery, as formerly practised by the western tribes, is given by Hunter. 'In manufacturing their pottery for cooking and domestic purposes,' he says, 'they collect tough clay, beat it into powder, temper it with water, and then spread it over blocks of wood, which have been formed into shapes to suit their convenience or fancy. When sufficiently dried, they are removed from the moulds, placed in proper situations, and burned to a hardness suitable to their intended uses. Another method practised by them is, to coat the inner surface of baskets made of rushes or willows with clay, to any required thickness, and, when dry, to burn them as above described. In this way they construct large, handsome, and tolerably durable ware; though latterly, with such tribes as have much intercourse with the whites, it is not much used, because of the substitution of cast-iron ware in its stead. When these vessels are large, as is the case for the manufacture of sugar, they are suspended by grape vines, which, wherever exposed to the fire, are constantly kept covered with

* Adair, 'History of the American Indians,' London, 1775, p. 424.

† Loskiel, 'Geschichte der Mission der evangelischen Brüder unter den Indianern in Nord-Amerika,' Barby, 1789, p. 70.

moist clay. Sometimes, however, the rims are made strong, and project a little inwardly quite round the vessel, so as to admit of their being sustained by flattened pieces of wood slid underneath these projections and extending across their centres.'*

"Lastly, I will quote here the remarks made by Catlin relating to the fabrication of earthenware among the Mandans. 'Earthen dishes or bowls are a familiar part of the culinary furniture of every Mandan lodge, and are manufactured by the women of this tribe in great quantities, and modelled into a thousand forms and tastes. They are made from a tough black clay, and baked in kilns which are made for the purpose, and are nearly equal in hardness to our own manufacture of pottery, though they have not yet got the art of glazing, which would be to them a most valuable secret. They make them so strong and serviceable, however, that they hang them over the fire, as we do our iron pots, and boil their meat in them with perfect success. I have seen some few specimens of such manufacture, which have been dug up in Indian mounds and tombs in the southern and middle States, placed in our eastern museums and looked upon as a great wonder, when here this novelty is at once done away with, and the whole mystery; where women can be seen handling and using them by hundreds, and they can be seen every day in the summer also, moulding them into many fanciful forms, and passing them through the kilns where they are hardened.'†

"The largest vessels made by the Indians, it seems, were those used in procuring salt by evaporation near salt springs. Du Pratz mentions a locality in Louisiana where the aborigines collected salt in earthen vessels made on the spot, before they had been supplied with kettles of metal by the French.‡ The 'Knight of Elvas' likewise describes the method of salt-making employed by the natives. 'The saline below St. Genevieve, Missouri,' says Brackenridge, 'cleared out some time ago and deepened, was found to contain waggon loads of earthenware, some fragments bespeaking vessels as large as a barrel, and proving that the salines had been worked before they were known to the whites.'§

* Hunter, 'Manners and Customs of several Indian tribes located west of the Mississippi,' Philadelphia, 1823, p. 296, &c.

† Catlin, 'North American Indians,' London, 1848, vol. i., p. 116.

‡ Du Pratz, vol. i., p. 307.

§ Brackenridge, 'Views of Louisiana,' Pittsburg, 1814, p. 186.

"I had occasion to examine a fragment of a vessel of this kind sent to Dr. Davis in 1859 by Mr. George E. Sellers, who obtained it at the salt springs near Saline river, in southern Illinois, a locality where salt was formerly made by the Indians. Several acres, Mr. Sellers states, are covered with broken vessels, and heaps of clay and shells indicate that they were made on the spot. They present the shape of semi-globular bowls with projecting rims, and measure from thirty inches to four feet across the rim, the thickness varies from one-half to three-quarters of an inch. This earthenware has evidently been moulded in baskets. The fragment sent to Dr. Davis is a rim-piece three-quarters of an inch thick, consisting of three distinct layers of yellowish clay, mixed with very coarsely-pounded shells. It is solid and heavy, and must have been tolerably well baked. The impressions on the outside are very regular and are really ornamental, proving that these aboriginal potters were also skilful basket-makers.

"It would be erroneous to suppose the art of manufacturing clay vessels had been in use among all the tribes spread over this widely extended country; for, though exhibiting much general similarity in character and habits, they differed considerably in their attainments in the mechanical arts. This arose from local circumstances, such as configuration and quality of the soil, climate, and other natural conditions which influenced, or rather determined, their mode of life. Some of the North American tribes, who did not understand the fabrication of earthen vessels, were in the habit of cooking their meat in water made to boil by means of heated stones, which they put into it, the receptacles used in this operation being large wooden bowls, water-tight baskets, or even the raw hides of animals they had killed. The Assinaboins, for example, cooked in skins. 'There is a very curious custom among the Assinaboins,' says Catlin, 'from which they have taken their name—a name given them by their neighbours from a singular mode they have of boiling their meat, which is done in the following manner:—When they cook meat, a hole is dug in the ground about the size of a common pot, and a piece of the raw hide of the animal, as taken from the back, is put over the hole, pressed down with the hands close around the sides, and filled with water. The meat to be boiled is then put in this hole or pot of water; and large stones, heated to a red heat, are successively dipped and held in the water until the meat is boiled; from which singular and peculiar custom, the Ojibbeways

have given them the appellation of Assinaboins or Stone-boilers.*

"'This custom,' he continues, 'is a very awkward and tedious one, and used only as an ingenious means of boiling their meat by a tribe too rude and ignorant to construct a kettle or pot. The traders have recently supplied these people with pots; and even long before that, the Mandans had instructed them in the secret of manufacturing very good and serviceable earthen pots, which together have entirely done away the custom, excepting at public festivals, where they seem, like all others of the human family, to take pleasure in cherishing and perpetuating their ancient customs.'† Yet, the Assinaboins may, nevertheless, have been acquainted with the art of pottery; for they are a detached branch of the Dacotahs, probably of the Yankton band of that nation, and we have the testimony of Carver, for instance, that the Naudowessies—that is, the Dacotahs or Sioux—made 'pots of clay, in which they boiled their victuals.'‡

"Some of the tribes of New Mexico and Arizona, as, for example, the Mojaves and Pimas, still manufacture pottery; but the Pueblo Indians of those districts are especially noted for their pottery. 'They manufacture, according to their aboriginal art, both for their own consumption and for the purposes of traffic, a species of earthenware not much inferior to the coarse crockery of our common potters. The pots made of this material stand fire remarkably well, and are the universal substitutes for all the purposes of cookery, even among the Mexicans, for the iron castings of this country, which are utterly unknown there. Rude as this kind of crockery is, it nevertheless evinces a great deal of skill, considering that it is made entirely without the lathe or any kind of machinery. It is often fancifully painted with coloured earths and the juice of a plant called 'guaco,' which brightens by burning.§

"Speaking of that region, I must not omit to allude to the numerous fragments of ancient pottery which occur on the Little Colorado (Colorado Chiquito), and Gila, especially among ruins; these are often highly decorated and are painted with various colours, exhibiting a style of workmanship differing from and surpassing that which prevailed on the eastern side of the Rocky Mountains. Descriptions of these relics, however, would

* See pp. 60, 61.

† Catlin, vol. i., p. 54.

‡ Carver, 'Travels,' London, 1781, Harper's reprint, p. 154.

§ Gregg, 'Commerce of the Prairies,' Philadelphia, 1851, vol. i., p. 278.

exceed the intended limits of this essay, and, moreover, they have been given elsewhere, together with the speculations concerning the character of the manufacturers.*

"Some years ago, while visiting northern Europe, I had occasion to see many specimens of ancient pottery deposited in the archæological collections of that district, and having previously become acquainted with the character of North American aboriginal pottery, it afforded me great pleasure to trace the similarity in the fictile manufactures of both continents. When the external conditions of life were similar among men, their inventive powers were necessarily exerted in a similar manner. We have the testimony of Tacitus, that the inhabitants of Germany lived, about two thousand years ago, much in the manner of the North American Indians, before the original habits of the latter had undergone the changes resulting from their intercourse with Europeans or their descendants; and it is, therefore, quite natural that both races should have resorted to the same, or, at least, similar, means to satisfy their wants.

"The aborigines of North America, to recapitulate the general characteristics of their pottery, formed their vessels by hand, modelling them sometimes in baskets, and were, as far as we know, unacquainted with the art of glazing. They mixed the clay used in their pottery either with pounded shells or sand, or with pulverized silicious rocks; mica also formed sometimes a part of the composition. Their vessels were often painted with ochre, producing various shades, from a light yellow to a dark brown, or with a black colour. They decorated their pottery with lines, or with combinations of lines and dots. Their vessels exhibit a great variety of forms and sizes, and many of them have rounded or convex bottoms. They burned their pottery in open fires or in kilns, and, in some instances, it appears to have been merely dried in the sun.

"The same parallel and zigzag lines, or rows of dots, which decorate Indian vessels, are seen on the ancient pottery of Europe. They constitute the simplest elements of ornamentation, and have, therefore, everywhere been employed by man when he made his first attempts in the art of decoration. On the surface of a few ancient vases or urns found in Germany I noticed those markings which present the appearance of basket-

* The reader is referred to an excellent chapter by Mr. Thomas Ewbank, entitled 'Illustrations of Indian Antiquities and Arts,' in the third volume of 'Pacific Railroad Reports,' Washington, 1856.

work; I was, however, in doubt whether they were impressions produced by the inside of baskets, or simply ornamental lines traced on the wet clay. Yet, even in the latter case, it would seem that this kind of ornamentation was suggested by the former practice of modelling vessels in baskets. I further saw some apparently very old specimens of pottery with rounded bottoms. The oldest vessels of all nations, who practised the potter's art, probably exhibited that shape, the model of which was furnished by nature in the gourd and other fruits presenting rounded outlines. A flat bottom, therefore, would denote a progress in the ceramic art. Other particular features common to the pottery of both the ancient inhabitants of Europe and the aborigines of North America, might be pointed out; but the fictile fabrics of the former exhibit, on the whole, more elegance of outline, and therefore indicate a higher state of art. The similarity in the manufactures of men in various countries is greatest when art is in its very infancy among them. In the course of gradual development the primitive forms common to mankind become more and more indistinct, and finally diverge into those varied and characteristic shapes which reflect the individuality of nations."

SOUTH AMERICA.

Stone Implements, Pottery, &c., from South America. Case A 52, E 10 to E 13.

Ecuador.

A 52.

Nos. 3, 7, and 8 are stone implements from Ecuador. No. 3 is of simple wedge-shaped form (Paris Exhibition, 1867). A stone hatchet of similar type can be seen in Case E 2, No. 20, in its original wooden handle. This specimen is from British Guiana, and was presented to the Collection by Mr. W. Morrison, M.P. A similar hatchet, in its original handle, from British Guiana, is in the British Museum, and another is preserved in the Guernsey Museum.

No. 8 has two lateral projections at the butt-end; probably these were of use in attaching the implement to the handle.* Varieties of this type are abundant in South America, although they are frequently of smaller size than No. 8. In Mr. Evans's Collection, at Nash Mills, and in the Christy Collection, there are several stone hatchets from South America, with notches at the sides towards the butt-end. In the Museum of Practical Geology, Jermyn Street, there is a hatchet of jasper, about three and a half inches long, with notches at the sides; it was found at Chope, Peru. In the British Museum there is a stone hatchet with wing-like projections at the sides; it was obtained from the Temple of Cuzco, Peru, and formed part of the Brandon Collection.

No. 7 is a dentated stone implement, with a drilled central hole; it was found in Ecuador, and was perhaps intended for arming a club. Tablet 5 *a* is an obsidian flake, and *b* is an obsidian arrow-head, both found near Guayaquil, Ecuador. (Paris Exhibition, 1867.)

* See page 225.

Poisoned Weapons.

In parts of South America poisoned weapons take the place of stone-tipped arrows;* they have not been displaced even by the gun or the rifle, for poisoned weapons are found by the Indian to be as useful, and as deadly, in the chase, or in war. Waterton expressly tells us† that he only found *one* gun among the Macoushi, and it appeared rusty and neglected; but their poisoned arrows were in fine order, and were in daily use.

We hear little from travellers of flint and stone arrow-heads in those districts where the "blow-tube" is in use. The slender poisoned dart, propelled through this tube by the human breath only, must be light; its deadly effect does not depend upon its penetrating deeply, nor upon its touching any vital organ; if the dart enters *any* part of the body death follows swiftly and surely, not so much from the wound as from the effect of the poison. Darts to be used with the blow-tube, and arrows to be discharged from the bow are, therefore, headed with wood. The arrows are from four to five feet in length, made of a yellow reed, headed with a piece of hard wood, about nine inches long, inserted into the end of the reed, and fastened with waxed cotton. At the end of the hard wood a square hole is made an inch deep, and into this a spike of coucourite wood, poisoned, is fitted. This spike can be removed at pleasure; twelve or fifteen such spikes are carried by the hunter in a little box, made of bamboo, about six inches long. The poisoned spike is cut half through, at about a quarter of an inch above the point where it fits into the socket of the arrow; and thus, when it has entered an animal, the weight of the shaft causes it to break off, the shaft falls to the ground uninjured, is fitted with another poisoned spike and used again.‡

In like manner the arrows of the Bushmen, Africa, often have the shafts partly cut through, so that they may break, and leave the point in the wound. In Case E 4, Nos. 24 to 26, are poisoned arrows from Sumatra; the serrated weapon of the

* The first Spanish colony founded on the continent of South America was named San Sebastian. On disembarking from the ships, seventy of the Spaniards were killed by the poisoned arrows of the Indians; on which account the dangerous spot was put under the special protection of the martyr who, from the circumstances of his death, might be supposed to feel a personal and peculiar sympathy with those who were exposed to the like sufferings.—Taylor, 'Words and Places,' p. 12.

† 'Wanderings in South America,' p. 35.

‡ Waterton, *l.c.*, pp. 65—67.

sting ray has been used for heading some of these, with the express intention that they might break off in the wound.*

The arrow-heads of the Shoshones of North America, said to be poisoned, are tied on purposely with gut in such a manner as to remain when the shaft is withdrawn.

A similar idea is carried out in a Venetian dagger of glass with a three-edged blade, having a tube in the centre to receive poison. By a sudden wrench from the assassin the blade was intended to be broken off and to remain in the wound.† One of these diabolical weapons was formerly in the possession of Mr. Latham, of Wilkinson's, Pall Mall.

The South American weapons, poisoned with wourali, are used not only to kill, but to kill *for food;* the meat of the creature is not affected by the poison; it can be, and is, eaten with impunity, and, if kept, it does not decompose more readily than if the animal had been killed with either the gun or the knife.‡

"In passing overland from the Essequibo to the Demerara," says Waterton, "we fell in with a herd of wild hogs. An Indian let fly a poisoned arrow at one of them; it entered the cheek-bone and broke off. The hog was found dead about 170 paces from the place where he had been shot. He afforded us an excellent and wholesome supper."§ The wild tribes of the Malay peninsula, who use poisoned arrows, eat the meat of animals killed by these deadly weapons, without even troubling themselves to cut out the wounded part.‖

There is reason for supposing that the discovery of the various poisons used for weapons, and the practice of applying them to such a purpose, arose spontaneously and separately in the various quarters of the globe. Poisoned weapons are used by the Negroes, Bushmen, and Hottentots of Africa; in the Indian Archipelago, New Hebrides, and New Caledonia. They are employed in Bootan, Assam, by the Stiens of Cambodia, and formerly by the Moors of Mogadore. The Parthians and Scythians used them in ancient times.¶

The composition of the poison varies in different races, the

* See 'Primitive Warfare,' by Colonel A. Lane Fox.—'Journal Royal United Service Institution,' vol. ix., No. xlvii., Dec., 1867, pp. 634—638.

† 'Primitive Warfare,' *l.c.*, p. 638.

‡ 'Waterton,' *l.c.*, p. 64.

§ 'Wanderings in South America,' *l.c.*, p. 67.

‖ Père Bourien, 'On the Wild Tribes in the Interior of the Malay Peninsula.'—'Trans. Ethno. Soc.,' vol. iii., p. 78.

¶ 'Primitive Warfare,' *l.c.*, p. 636.

Bushmen, Hottentots, and others using the venomous secretions of serpents and caterpillars.* In the Bosjesman country, Southern Africa, the natives hunt the puff-adders, in order to extract the poison. They creep upon the reptile unawares, and break its back at a single blow. The poison-glands are then extracted; the venom is very thick, like glycerine, and has a faint acid taste. This is mixed on a flat stone, with an acrid poisonous gum, called "parki;" after being worked until it becomes of the consistency of thick glue, it is spread over the barbed head of the arrow and for about two inches up its point. The arrows are then dried in the sun. Each warrior carries some half-a-dozen of these devilish weapons, a wound from one of which is as deadly as the bite of the adder itself.†

In Ceylon, the cobra-tel poison is extracted from certain venomous snakes, such as the Cobra de Capello (from which the poison takes its name), the Carawella, and the Tic polonga; arsenic and other drugs are added, and the whole is "boiled in a human skull." Three Kabra-goyas (*Hydrosaurus salvator*) are tied near three sides of the fire, with their heads towards it, they are tormented with whips to make them hiss, so that the fire may blaze! The froth from their lips is added to the boiling mixture, and as soon as an oily scum rises to the surface, the "cobra-tel" is complete. Probably the arsenic is the most active ingredient in this poison. ‡

The Ceris are said to prepare poison for their arrows in the following manner:—"They first kill a cow, and take from it its liver; they then collect rattle-snakes, scorpions, centipedes, and tarantulas, which they confine in a hole with the liver. The next process is, to beat them with sticks, in order to enrage them; and being thus infuriated, they fasten their fangs and exhaust their venom upon each other, and upon the liver. When the whole mass is in a state of corruption, the women take the arrows and pass their points through it; they are then allowed to dry in the shade.§

The Indians of Choco and Barbacoas use the "Veneno-de-rana" or frog poison, which is obtained by placing a species of yellow frog, that frequents the swamps, over hot ashes, and scraping off the viscid humour that arises. After thus tortur-

* Thernberg's Account of the Cape of Good Hope.—Livingstone.

† N. A. Wood, 'Serpents and Venomous Snakes,' in 'Belgravia,' vol. viii., No. 31, May, 1869.

‡ Tennant, 'Ceylon,' vol. i., p. 183.

§ Hardy, 'Travels in Mexico,' London, 1829, p. 298.

ing the frogs, they are allowed to escape, in order that they may serve another time. "Veneno-de-culebra," or snake poison, is also said to be used in Choco.*

In many other parts of the world the poison is extracted from plants growing in the particular country. Thus the wourali poison is prepared from climbers indigenous to the locality.† The discovery of the properties of these plants, and of the use to which their juice could be applied, was, probably, made by the Darien Indians themselves. How completely must such a discovery have altered the habits and mode of life of the discoverers! What a very incorrect opinion we might have formed of any prehistoric race who had used poisoned weapons! The wood-tipped arrows, the blow-tube, and the bow, would have perished, and we might have argued, from the rarity of stone weapons, that the people lived in a comparatively defenceless condition, and that they possessed but imperfect means of supplying themselves with food by hunting. It is unsafe to measure the capabilities of the various prehistoric races for the successful prosecution of war, the chase, and the ordinary branches of handicraft, solely by the few stone implements and weapons which have come down to our time. A glance round the Blackmore Museum will show the proportion that implements and weapons of wood bear to implements and weapons of stone among modern savages. What has become of the darts and other wooden missiles used by prehistoric races? The club was, perhaps, one of the earliest forms of weapon, but it is almost wholly missing from the prehistoric armoury. We may truly say of stone implements that they are the minor monuments of antiquity—"Time which antiquates antiquities, and hath an art to make dust of all things, hath yet spared these minor monuments." Having, then, these minor monuments, we seek to reconstruct that which has been lost by observing the habits of modern savages; and the case of the poison-using South American, with his wood-tipped weapons, may teach us caution in attempting to estimate the condition of prehistoric races *solely* from their stone implements.

Primitive man must have been little fitted to contend with the large and powerful animals of the Quaternary period, unless he possessed other and more deadly weapons than the poor flint

* Dr. Cullen, 'The Darien Indians.'—'Trans. Ethno. Soc.,' vol. vi., p. 163.

† The mode of preparing the wourali poison, and some account of its nature and use, will be found at pp. 266—269.

implements, which we find in our valley-gravels and caves. We cannot, therefore, avoid asking ourselves the question, whether he too, like the modern savage, had acquired the subtle art of poisoning weapons. The climate, however, at this early period in man's history was extremely rigorous, and we must remember that the use of poisoned weapons, in later times, has been almost entirely limited to tropical countries, in which poisonous plants and reptiles abound.

It has been suggested that the grooves which occur upon some of the bone harpoon-heads found in the Dordogne caves were intended to receive poison.*

"In most of these harpoon-heads there are long grooves on the barbs, and almost always on both sides. These grooves are most frequently single; but sometimes they are double; and they follow the curve of the barbs, which sometimes end in a sharp hook and sometimes with a nearly smooth point. It has been conjectured, in searching for an explanation of the probable use of these grooves, that they may have served to hold a poisonous substance, active enough to hasten the death of the wounded animal."† It is scarcely necessary to remind the reader that these harpoon-heads belong to the Palæolithic period. See specimens on Tablet 1, Case B 13, and Tablets 3 to 8, Case B 15.

A 52.

Upon Tablet 4 are some terra-cotta beads with incised ornaments, found in a *tola*‡ near the village of Naranjal, Ecuador. (Paris Exhibition, 1867.) Upon Tablet 6 is an obsidian flake, a terra-cotta bead, and some copper ornaments found in some Indian graves, near Naranjal. (Paris Exhibition, 1867.)

Pottery from Ecuador.

E 12.

The pottery shown from Ecuador was found at Porto-Viejo.

* For a short account of the Caves of Dordogne, see pp. 51—56. Also 'Guide to the Christy Collection,' 1868, pp. 6—8. For a full description, see Lartet and Christy, 'Reliquiæ Aquitanicæ (nine parts already published). London, Baillière.

† 'Reliquiæ Aquitanicæ,' part i., Dec., 1865, p. 10.

‡ A *tola* is an artificial mound of sand, analogous to the tumulus of the Old World.

After floods the banks of the river founder, and pottery and other antiquities are met with in the detritus. All the specimens from Ecuador were obtained from the Paris Exhibition, 1867.*

No. 1.—Small figure of brown ware, in the form of a bird, pierced with several holes. The hole at the back of the figure may have served for suspension.

No. 2.—Fragment of fine black ware, in the form of a woman's head, with a curious cap, similar to that upon the heads of figures Nos. 6 and 7. The ears and nose are pierced to receive ornaments; the present rings in them are probably modern additions; the nose is very aquiline.

No. 3.—Small figure of brown ware, in the form of a bird, pierced with holes and ornamented with incised lines and dots.

Nos. 6 and 7.—Fragments of vessels of light-coloured brown ware, in the form of women's heads.

No. 8.—Figure of a toad, in brown ware (probably modern).

Nos. 10 and 13.—Fragments of vessels of brown ware, representing heads of Indians. No. 7 wears a nose ornament. The noses of both figures are very aquiline.

Nos. 11 and 12.—Figures of Indians, in brown ware.

No. 15.—Vessel of coarse red ware, with handle.

No. 16.—Grotesque figure, of black ware.

No. 17.—Flat piece of red ware, pierced for suspension; upon one surface is the representation of two human figures.

No. 18.—Figure of a frog, or toad, in coarse black ware.

No. 19.—Whistle of brown ware, in the form of an Indian, the ears are pierced.

No. 20.—Vessel of brown ware with handle: the spout has been painted red, beneath which are traces of a collar of black, white, and red ornament in lines and dots.

No. 21.—Figure of an Indian, in red ware, having a curious head-dress, and decorated with incised lines.

No. 22.—Bowl of red ware, the upper part painted white. This vessel has been used by the Ticunes in the preparation, or at least for the reception, of wourali poison, a lump of which is inside the bowl; a quantity remains attached to the lip of the vessel. The poison is sometimes carried in a gourd.

Nos. 23 and 24.—Drawings of the plant, &c., used in the preparation of wourali poison. They were presented to the Collection by M. Ed. Durassié.

Wourali, woorali, curari, or urari, is a very active poison

* 'Notice et Catalogue, République de l'Equateur,' Paris, 1867, p. 59.

prepared by several tribes, in South America, who, as far as possible, keep the manufacture a secret. The most deadly wourali is prepared by the Ticunes; the basis of the poison is the juice of a climbing plant, *Strychnos toxifera*, a drawing of which, No. 23, is exhibited.*

Waterton says that, although "the wourali poison is used by all the South American savages inhabiting the region between the Amazon and the Orinoco, still the Macoushi make it stronger than any of the rest. The Indians in the vicinity of the Rio Negro are aware of this, and come to the Macoushi country to purchase it."†

No. 25.—Quiver of arrows, or darts, poisoned with wourali. These arrows are about 10 inches long, extremely slender, scraped to a fine point at one end and cut like a corkscrew for an inch up, showing a very fine thread that forms a spiral screw; this is rolled in the poison, which is allowed to dry on it. These arrows are remarkable for their hardness, weight, and elasticity; they are made of the leaf-ribs of the coucourite palm (*Maximiliana regia*).

The quiver is made of strips of bamboo plaited, coated with wax, and then covered with a piece of the hide of a tapir or peccari.‡

In shape the quiver resembles a dice-box. Round the middle there is fastened a loop large enough to admit the arm and shoulder, from which it hangs when used. To the rim is tied a little bunch of silk grass, and half of the jaw-bone of the fish called "pirai," with which the Indian scrapes the point of his arrow. Before the arrows are put into the quiver they are linked together by two strings of cotton, one string at each end, and are then folded round a stick, which is nearly the length of the quiver.§ These arrows are used with a blow-tube, through which, by a sudden expiration of the breath, they can be projected about 100 yards with great accuracy of aim. It is certain death to any animal struck. A jaguar, when hit with a poisoned arrow, says Dr. Cullen, runs ten or twelve yards, staggers, vomits, and dies in four or five minutes. A bird is killed as by a bullet.‖ An animal, after receiving the poisoned arrow, seldom retreats

* 'Notice et Catalogue, République de l'Equateur,' Paris, 1867, p. 61.

† 'Wanderings in South America,' pp. 51, 52.

‡ Dr. Cullen, 'The Darien Indians.'—'Trans. Ethno. Soc.,' vol. vi., p. 163.

§ Waterton, 'Wanderings in South America,' p. 62.

‖ Dr. Cullen, *l.c.*, p. 163.

two hundred paces before he drops,* says the more cautious Waterton.

Trophy. R 8.

No. 1 is a blow-tube from British Guiana, used for shooting poisoned arrows; this blow-tube is covered with plaited bamboo.

The Macoushi say that the plant of which blow-tubes are made does not grow in their country; they have to obtain it from the wilds which extend to the south-east, between Macoushia and the Rio Negro. The reed must grow to an amazing length, as the part the Indians use is from ten to eleven feet long, and no tapering can be perceived in it. It is of a bright yellow colour, and is perfectly smooth both inside and out. The natives call it "Ourah." This ourah would be too slender for use alone; it is therefore inserted in the stem of a palm, called "Samourah." Thus the ourah and the samourah, one within the other, form the blow-tube of Guiana.† Dr. Cullen says that the blow-tube is sometimes made of the stem of a young palm of the genus Iriartea.‡

The Macoushi rarely use any weapon but the blow-tube in hunting small game. The larger animals are killed with poisoned arrows shot from the bow.§ Dr. Cullen says that "the Darien Indians do not prepare the wourali, but get it from the Chocoanos;"‖ he adds, the basis of the wourali poison is an inspissated extract of the barks of *Strychnos toxifera* and *S. cogens*, two twining plants. Waterton says that the vine itself is called wourali, hence the name of the poison obtained from it. Other ingredients, some of which probably do not add to the deadly nature of the poison, enter into the composition of wourali. These are, a root of a very bitter taste, two kinds of bulbous plants, which yield a green and glutinous juice, a large black ant, and a small red ant, the strongest Indian pepper, the pounded fangs of the Labarri snake, and those of the Counacouchi. The vine and the roots are scraped into thin shavings which are put into a colander made of leaves, this is held over an earthen pot, and water is poured over the shavings, the other ingredients are next added, and the whole is boiled over a slow fire until it is

* Waterton, *l.c.*, p. 67.

† Ibid. *l.c.*, pp. 60, 61.

‡ 'The Darien Indians.'—'Trans. Ethno. Soc.,' vol. vi., p. 163.

§ For a description of these arrows, see p. 259.

‖ 'The Darien Indians.'—'Trans. Ethno. Soc.,' vol. vi., p. 163.

reduced to a thick syrup of a deep brown colour. It is then poured into a calabash, or a little earthen pot of Indian manufacture (No. 22).*

The preparation of wourali is surrounded with imaginary dangers to the superstitious savage. Women and young girls must not be present during the process, lest the Yabahou, or evil spirit, should do them harm.† The shed under which wourali has been boiled, is pronounced polluted, and is abandoned ever after. He who makes the poison must have eaten nothing that morning, and must continue fasting throughout the operation. The pot in which wourali is boiled must be a new one, and must never have held anything before, otherwise the poison would be deficient in strength! Although the maker takes care not to expose himself to the vapour which arises from the pot while on the fire, and frequently washes his face and hands during the process, still the Indians think it affects the health; and the operator either is, or, what is more probable, supposes himself to be, sick for some days after. It appears even as if the deadly nature of the manufacture is supposed to extend to the family of the wourali-maker, for an Indian agreed one evening to make some for Waterton, but the next morning declined to fulfil his engagement, alleging as a reason that his wife was with child‡

The deadly qualities of wourali poison have been tried upon various animals. A middle-sized dog was wounded in the thigh, in order that there might be no possibility of touching a vital part. In three or four minutes he began to be affected, smelt at every little thing on the ground around him, and looked wistfully at the wounded part. Soon after this he staggered, laid himself down, and never rose more. He barked once, though not as if in pain. His voice was low and weak, and in a second attempt it quite failed him. He now put his head betwixt his fore legs, and raising it slowly again, he fell over on his side. His eye immediately became fixed, and though his extremities every now and then shot convulsively, he never showed the least desire to raise up his head. His heart fluttered much from the time he laid down, and at intervals beat very strong; then stopped for a moment or two, and then

* Waterton, 'Wanderings in South America,' pp. 55, 56.

† In Ceylon, when they make the "cobra-tel" poison, a cock is sacrificed to propitiate the Yakhos, or demons. See p. 261.

‡ Waterton, *l.c.*, pp. 55—60.

beat again, and continued faintly beating several minutes after every other part of his body seemed dead. In a quarter of an hour after he had received the poison he was quite motionless.*

An ai, or three-toed sloth, was wounded in the leg with an arrow poisoned with wourali; the animal died in eleven minutes. An ox was shot in each thigh and in the extremity of the nostril with similarly poisoned arrows; the poison took effect in four minutes. In five and twenty minutes the animal was dead. "His flesh was very sweet and savoury at dinner."† An ass, inoculated with wourali poison died in twelve minutes. Another ass received the wourali poison in the shoulder and died, apparently, in ten minutes. She was restored by inflating her lungs with a pair of bellows for four hours.‡

A fowl was wounded in the thigh with a poisoned arrow. For the first minute it walked about, during the second it stood still and began to peck the ground, in less than another half minute its tail drooped, the wings almost touched the ground, and it frequently opened and shut its beak. By the termination of the third minute it had sat down, its head nodded, the eyes opened and shut. The fourth minute brought on convulsions, and it died at the end of the fifth minute.§

Catlin mentions the almost instantaneous death of two peccaries when struck with arrows poisoned with wourali.‖

Some of the Indians of Guiana, such as the Otomacs, although apparently weaponless, poison their thumb nail with wourali; a scratch from such a foe is fatal.¶

A mixture of strychnine and wourali has, of late, been used in whaling. An ounce of the mixture, attached to an explosive shell, is fired from a carbine; when struck, the whale dies in less than eighteen minutes, without risk to the whaler.**

The wourali is supposed to affect the nervous system, and to destroy the vital functions; it is also said to be perfectly harmless, provided it does not touch the blood. However, this is certain, when a sufficient quantity of it enters the blood, death ensues; but there is no alteration in the colour of the blood,

* Waterton, 'Wanderings in South America,' pp. 20, 21.

† Ibid., p. 71.

‡ Ibid., p. 83.

§ Ibid., p. 64.

‖ 'Last Rambles amongst the Indians,' pp. 66, 67.

¶ Humboldt, 'Aspects of Nature,' vol. i., pp. 25 and 103.

** 'Times,' 24th December, 1866.

and both blood and flesh may be eaten with safety. The wourali poison destroys life's action so gently, that the victim appears to be in no pain whatever; and probably, were the truth known, it feels none, saving the momentary smart at the time the arrow enters.*

Brazil.

A 52.

No. 9 (S and D 528) is a plummet-like stone object, from Brazil; it formed part of the Squier and Davis Collection, and Dr. Davis suggests, in a manuscript catalogue sent with the specimens, that it has been used as a net-sinker; he refers to Ewbank's "Brazil" for information, but the book is not within the writer's reach. It appears highly improbable that an object so highly finished as No. 9 should have been used as a net-sinker.

Similar stone plummets may be seen in Case A 48, Nos. 21 and 22, from Ohio. In Case D 19, upon Tablet 10, are other plummets of shell, from a shell-mound in Florida.

Peru.

A 52.

Nos. 10 to 19 are various objects from Peru, most of which are of no great antiquity. No. 10 (S and D 37) is a spindle with the stone spindle-whorl † still attached to it, and having some of the spun alpaca wool around the stick. No. 11 (S and D 38) is a stone spindle-whorl (?). Nos. 10 and 11 were found in graves, in Peru. No. 12 (S and D 571) is described by Dr. Davis as "an amulet, with a hole through one end for suspension, and a cavity in the other for holding feathers; there is a signet at the side."

Tablet 13, *a* (S and D 35) is a "reed or tube, used perhaps for sucking 'Matta' tea;" *b* (S and D 34) is "a piece of the Pito, a species of aloe. This spongy wood is the 'Pao de Fogo' (tinder-wood) of the natives"; *c* (S and D 36) is described as "a

* Waterton, *l.c.*, pp. 54, 55.

† See notice of spindle-whorls, p. 94.

flat piece of wood with a hole through the centre, the use not known;" may it not have been used as an ornament? in form it closely resembles some of the stone "gorgets;" *d* (S and D 33) "a piece of wood much decayed, use not determined;" this may have been a fire-drill;* it is like the Esquimaux fire-drills, Nos. 39 and 40, Case C 42, and No. 13 *c*, Case D 5, which last was found in a grave in Greenland.

Upon Tablet 14 (S and D 30) are some grains of maize, and upon Tablet 15 is part of the cob with grains of maize attached. They were found in a grave, placed in a very nicely plaited basket, which is in the Collection, but cannot be shown from want of space. Upon Tablet 14 *b* (S and D 31) are some beans, also found in the basket, as well as the flat bone beads (S and D 32) upon Tablet 16; a thread of twisted alpaca wool still remains in the central hole of some of these beads. In Case D 7, upon Tablets 1 to 10, and 12, are similar beads, made of shell, used for decorative purposes by the natives of Salomon Islands. No. 17 (S and D 567) is a stone amulet (?), nicely ornamented. No. 18 (S and D 572) is "an ornament of steatite† cut into the shape of a fish-hook." Fish-hooks of this form, from the Sandwich Islands, can be seen in Case D 6, upon Tablets 18 and 19.

No arrow-heads are in the Collection from Peru, but in the British Museum there are some wooden arrow-shafts—or, rather, the upper parts of shafts, for they taper at one end, probably to enable them to fit into a socket in a reed, or some lighter kind of wood, which formed the end of the shaft. These shafts are painted of a red colour, and are armed with arrow-heads of milky quartz, bound on with fine cord, made of alpaca wool. They were found in some tombs at Molle, Peru.

In the British Museum Collection there are some stone weights for fishing lines, grooved at each end for suspension, from Molle; a stone pestle, for bruising maize, and a stone "gorget,"‡ about six inches in length, with a drilled hole at each end; both from Peru; as well as a wedge-shaped stone hatchet of large size.

* For an account of the fire-drill, see pp. 97, 98.

† Professor Church informs me that this substance is very hard slate, the whet-slate of Cotta. It appears to have been largely used for ornamental purposes by the Ohio "Mound Builders."—E.T.S.

‡ Allusion has been made, at pp. 99, 100, to stone "gorgets." More will be said of them when the North American stone gorgets are described.

Cases E 10, E 11, and H 19.

Pottery from Peru.

E 10.

Many of the vessels exhibited from Peru are "huacas," and were intended to hold "chicha," a drink made from maize. They were frequently deposited with the dead.

Some of the Peruvian vessels are double, in this respect repeating with considerable similarity the *bijugué*, or twin-bottle, of the ancient Egyptians;* others have double spouts, which also constitute a characteristic feature of the water-pitcher, called the "monkey," still in universal use in Brazil. A few are of simple and graceful forms, and others are modelled from melons, gourds, and other fruit. These are occasionally found with a grotesque animal head added as the mouth of the vessel. Among the animal figures which have been observed in Peruvian pottery are the duck, parrot, pelican, turkey, land-turtle, monkey, lynx, otter, llama, toad, cayman, shark, &c.†

The greater part of the sacred vessels buried with the mallquis, and destined to receive the chicha of sacrifice on feast-days, have an enlarged neck, placed ordinarily near the handle, with a hole to pour out the liquid, and an opposite opening through which the air escapes whilst the vessel is being filled. Many are double; others are quadruple or sextuple, or even octuple; that is, the principal vessel is surrounded with regular appendages, which communicate among themselves and with the principal vessel.‡ It is said that some of the double vessels, whilst they are being filled with fluid, emit sounds from the air-holes which imitate the voice of the animal represented by the principal part of the vessel. In making this experiment it is highly desirable that the listener should be possessed of a lively imagination.‖

No. 1. Vessel of brown ware, ornamented with colour in lines

* See Marryat, 'History of Pottery,' 2nd edit., fig. 190, p. 358. A Chinese porcelain double-bottle is figured in the same work, fig. 129, p. 217, as well as a double-bottle, from Chili, fig. 191, p. 358, and one from Mexico, fig. 216, p. 396.

† Wilson, 'Prehistoric Man,' vol. ii., pp. 110, 111.

‡ Dr. Tschudi, quoted by Wilson, in 'Prehistoric Man,' vol. ii., pp. 111, 112.

‖ I have succeeded in producing a shrill whistle from No. 15 by filling it with water; the sound was very unlike the note of a bird.—E. T. S.

and crosses. The lower part of the vessel is in the form of a human head, with ornaments (labrets) in the lips, and similar ornaments in the ears; the nose is extremely aquiline. It was presented to the Collection by the late Admiral Sir William Bowles, K.C.B.

No. 2 (S and D 61). Vessel of fine red ware, in the form of a man, seated, with his arms crossed and tied behind his back.

This prisoner has a cord round his neck, with a loose end hanging down his back, probably for leading him. The features of the figure are quite unlike those of No. 1.

No. 3 (S and D 62). A similar vessel to No. 2, but the ware is not so fine, and the modelling is not so carefully executed. It is in the form of a woman, seated; round pendants hang from her pierced ears; the features of the figure resemble those of No. 2. The vessel has been ornamented with white paint.

No. 4 (S and D 83). A frog or toad of black ware. It formed part of some vessel.

No. 5 (S and D 71). Rattle of black ware, the upper part in the form of a human head, wearing a cap with two conical projections at the corners. A similar form of cap can be seen on the figure, No. 22.

No. 6 (S and D 566). Small figure of a bird in red ware; a hole passes through the head in the position of the eyes.

No. 7 (S and D 60). Double vessel of black ware. This is one of the whistling jugs. One of the bottles is in the form of a man, wearing a conical cap; ornaments are in the ears; a cord is passed round his neck, and a second cord is round his waist; he appears to be asleep, with his head falling on one side, but he is prevented from slipping farther by the cord. Dr. Davis is of opinion that "the man is evidently under the influence of chicha."

No. 8 (S and D 56). Vessel of black ware, in the form of the fruit of the "chirimoya."

No. 9 (S and D 55). Vessel of red ware, with a handle, in the form of a squash.

No. 10 (S and D 48). Vessel of fine black ware, with handle, ornamented with human figures and human heads. The face of the central head is decorated with lines, perhaps intended to represent tattooing. This vessel stands upon a regular ring carried round the base.

No. 11 (S and D). Vessel of red ware, coarsely painted with red, black, and white lines and figures, having two ears at the sides, which are pierced for suspension.

No. 12 (S and D 45). Vessel of red ware, coarsely painted with red and black lines, having two handles at the sides.

No. 13. Small vessel of brown ware, in the form of a puma. It was obtained from the ruins of Truxillo, by Mr. G. Miller, purser, H.M.S. Tartar, and was formerly in the United Service Museum. The head of the animal upon the vessel No. 4, Case E 11, shows a similar conventional treatment.

No. 14 (S and D 54). Water-dipper (?) of red ware. The handle terminates with the figure of a human head, wearing a singular head-dress, fastened beneath the chin by a band, and falling in folds at the back of the head. The head-dress is decorated with red. The handle and the under side of the vessel are painted white. Two eagles, feeding, are painted in red upon the back of the vessel.

No. 15. Double vessel, of black ware—a whistling jug. One of the bottles has the top in the form of a bird's head. By blowing through the tube upon the top of the other bottle a whistle is produced; the note can be varied by closing some of the holes in the bird's head.*

No. 16 (S and D 70). Small figure of coarse ware, with holes at the sides for suspension. Found at Truxillo.

No. 17 (S and D 59). Vessel of coarse red ware, in the form of a sitting monkey; a cord is passed round the neck and middle, as with the human figure No. 2.

No. 18. Vessel of black ware, the spout gone, in the form of a woman's head, with the hair elaborately braided and dressed. A circular ornament is in the right ear. This specimen was formerly in the United Service Museum. A similar vessel is preserved in the British Museum, and has been figured by Marryat.†

No. 19. Vessel of black ware, formerly in the United Service Museum.

No. 20. Vessel of brown ware, in the form of a human figure, with necklace and braided hair. This specimen was presented to the Collection by the late Admiral Sir William Bowles, K.C.B.

No. 21 (S and D 47). A bottle or jug of black ware, furnished with what serves for both handle and spout, a peculiarity fre-

* These vessels are mere whistles; no musical skill or knowledge is evinced in their construction. In this respect they differ wholly from the Chiriqui whistles described at pages 281, 282.

† 'History of Pottery,' &c., p. 399, fig. 221.

quently met with in Peruvian pottery. Two rude figures of birds ornament this vessel.

No. 22 (S and D 53). Vessel of black ware, with a handle having a tube (spout) at one end, and the representation of a human head at the other. The figure wears a cap, with conical projections, like that upon rattle No. 5.

No. 23 (S and D 63). Cast of a vessel, in the form of a man's head, wearing a helmet. The nose is very aquiline. This is a remarkable specimen of Peruvian art, and is highly interesting as illustrating the Peruvian type of countenance and the peculiarity of head-dress. The original is of red ware, ornamented with white. When in the possession of Dr. E. H. Davis, this vessel was figured.* It is now preserved in the collection of the American Ethnological Society.

E 11.

No. 1 (S and D 51). Vessel of red ware, having a handle with a tube (spout) at one end, and the figure of a bird, probably a toucan, at the other. The figures of two animals encircle the body of the vase. It is a whistling jug; the whole surface has been painted white, relieved with red lines. It stands upon a ring which is carried round the base, like No. 7. This vessel has been figured.†

No. 2 (S and D 57). Vessel of black ware, with a handle, in the form of a fish.

No. 3. Vessel of red ware, painted with black figures and lines.

No. 4 (S and D 58). Oblong vessel of black ware, the upper part in the form of a puma, suckling four young ones. The head of the puma has the same conventional treatment as that of No. 13, Case E 10. The potter in each instance has represented a condition of extreme leanness; the backbone and the ribs appear to be coming through the skin.

No. 5. Huacha of red ware, ornamented with lines and figures in white, red, and black. At the sides are two handles, and under the spout are two ears, with holes for suspension. The bottom of this vessel ends in a point; it could not have stood

* Wilson, 'Prehistoric Man,' vol. ii., fig. 42, p. 117. It is the fourth in the group, counting from left to right.

† Wilson, 'Prehistoric Man,' vol. ii., fig. 40, p. 111. It is the first figure to the left of the group.

without some kind of support; it was presented to the Collection by the late Mr. Lingard.

No. 6. Double vessel of black ware—a whistling jug; one bottle is in the form of a bird. It was formerly in the United Service Museum.

No. 7 (S and D 52). Vessel of fine black ware, in the form of a bird, very nicely modelled. This vessel has a ring at the base to render it firm in standing.

No. 8 (S and D 50). Vessel of red ware, ornamented with incised lines and streaks of black paint. Upon the handle there are four frogs, which have been painted black. This vessel has a ring at the base, as with No. 7.

No. 9 (S and D 46). Vessel of black ware, ornamented with lines and bosses, and having two ears at the sides, pierced for suspension.

H 19.

No. 10 (S and D 49). Vessel of black ware, with double spout, connected by the handle. The body of the vessel is melon-shaped.

No. 11. Vessel of black ware, formerly in the United Service Museum.

Pottery from Bolivia.

E 13.

No. 1. Vessel of red ware, in the form of a seated human figure, with an animal slung over each shoulder. This vessel is painted white, and is ornamented with red lines. (Paris Exhibition, 1867.)

Pottery from Uruguay.

E 13.

No. 2. Fragment of pottery, with impressed ornament, found at Salto, Uruguay. This specimen was presented to the Collection by M. Ed. Durassié. (Paris Exhibition, 1867.)

Pottery from New Granada.

E 13.

No. 3. Vessel of brown ware, with two spouts, connected by a handle, and ornamented with lines scratched after it had been fired. (Paris Exhibition, 1867.)

Pottery from British Guiana.

E 13.

Nos. 4 and 5. Rude terra-cotta figures of a man and a woman, made by the Macoushi Indians, British Guiana. (H. C. Whitlock's Collection, Exhibition, 1862.)

No. 6. Bowl of brown ware, made by the Caribisi Indians, river Essequebo, British Guiana. The vessel is glazed in the inside only, and is ornamented with red lines, chiefly, and more carefully, upon the inside. (George Dennis' Collection, Christy Museum.)

Stone Implements from various parts of South America.

A 52.

No. 20 is a stone hatchet said to have come from South America.* It was presented to the Collection by Mr. Jones.

In Mr. John Evans's Collection, at Nash Mills, there is a leaf-shaped implement of chert, very finely chipped, and about four and a quarter inches long, which was found in the desert of Atacama, Bolivia. Mr. Evans also possesses a wedge-shaped stone hatchet, found in a cave at Minas Geraes, Brazil. Some very interesting stone implements, found in New Granada, were shown in the Paris Exhibition, 1867.

* See page 191.

CENTRAL AMERICA.

THE OBJECTS FROM CENTRAL AMERICA ARE EXHIBITED IN CASES A 41, C 33, C 43, AND E 8.

CHIRIQUI.

An interesting series of objects is shown from some ancient Indian graves, at Chiriqui, in Veraguas, south-west of Panama, on the Isthmus of Darien.

In the autumn of 1858, two Spanish Creole farmers of Chiriqui, named Ignacio Guerra and Victorio Pitti, while harvesting a crop of corn, accidentally discovered a golden image, which had been exposed by the uprooting of a plant. They cautiously and secretly made farther search, and were successful in obtaining other specimens. They proceeded to make excavations, not continuously, but as circumstances permitted, until the 1st May, 1859, when their concealed operations became known to the inhabitants of the neighbourhood. The report of the discovery of treasure soon attracted numbers of diggers, and, by the middle of May, more than a thousand persons were engaged in ransacking the graves of this huacal, or ancient place of burial, which is situated in the district of Boqueron, parish of Bugaba, about 25 miles from David, and 15 miles only from the sea, in a direct line.

The original discoverers have admitted that, prior to this influx of treasure-seekers, they had collected about 130 pounds weight of golden figures, many of which were alloyed with copper.

Dr. J. King Merritt spent several weeks, in the summer of 1859, in examining the then newly-discovered burial-grounds of Chiriqui. He read a paper upon the subject before the American Ethnological Society, the substance of which is embodied in the present account. By the 1st of August, 1859, the huacal

of Bugaba had been thoroughly explored and robbed of its golden treasures. This burial-ground extended over an area of twelve acres; there was no general regularity in the position of the graves, but frequently several were found side by side. The distance between the graves at the more crowded parts varied from nine to fifteen inches.

Two forms of graves (huacas) were observed—circular or oval, and rectangular. The oval graves were from four and a half to six feet deep, and from three to four feet in their greatest diameter. A wall of rounded river stones, two and a half feet high, was built as a lining round the grave at the bottom. From the top of this wall to the surface the grave was filled with river pebbles. The gold ornaments, pottery, and other antiquities were chiefly found in the walled space beneath the deposit of pebbles. The circular and oval graves yielded the most figures of gold, and the finest specimens of pottery. The gold figures were sometimes inserted in the crevices of the wall,* but in no instance had they been placed in the earthen vessels found associated with them. No human remains were met with in the oval huacas; but a layer of black loam was interposed between the relics and the pebble deposit.

The quadrangular huacas were, in some instances, constructed in the same manner as the oval graves; there was the same wall of rounded pebbles, above which the entire space was filled with pebbles. The quadrangular graves of this description were larger, and yielded more relics, than the other quadrangular graves. They were freely interspersed with the oval graves in the northern and western parts of the huacal, or burial-ground, but were more numerous in the southern portion of it. Some of these huacas measured nearly six feet deep, seven feet long, and four and a half feet broad. The relics were found usually near the bottom, at the northern and southern extremities, and more or less on the eastern side. The gold figures were generally in the central line, and at about one-fourth of the distance from the head to the foot of the grave. Earthen vessels were sometimes found in the pebble deposit, near the surface, and if so, they were usually at either the head or the foot of the grave-space.

The other variety of quadrangular huaca, although poor in

* In a paper read by Mr. Whymper, at the Norwich meeting (1868) of the British Association, he remarked that the Greenlander has a great objection to use the property of the dead; accordingly their goods were deposited in their graves, their tools and weapons being frequently placed between the chinks of stones forming the tomb.—'Norfolk Chronicle,' August 26th, 1868.

relics, was more carefully and differently constructed. This variety existed chiefly in the southern and eastern sections of the huacal. A hole had been dug, six feet six inches long and four feet broad; at the depth of three feet, this space was contracted eight or ten inches on all sides, and was sunk to the additional depth of about two feet. This smaller excavation, or cist, was lined at the sides with flat stones placed edgewise, which were held in position by larger flat stones resting upon them, and the earthen ledge at the top of the cist. The floor of the cist was not paved; there were usually two depressions in it, corresponding with the probable position of the head and the heels of the body. The cist was covered with flat stones, and the space between the cover and the surface of the ground was filled with pebbles. The relics in these huacas were chiefly found at the head and foot, and on the eastern side. Scarcely any, if any, gold figures were found in this variety of huaca; pottery was found in the cist, and, sometimes, in the pebble deposit. A black loamy earth in the cist indicated the original position of the body.

Mr. John F. Bateman, of Panama, says of the Chiriqui graves* that they are all regularly built sepulchres, the body having been laid upon the "hard pan" or clay; the sides were formed of flat stones, and the cover was of larger flat stones, many of which would measure a yard square. The graves varied in depth, ranging from three to ten feet; the distance of the "hard pan" from the surface regulated the depth, for the body was always placed upon it. The bodies were deposited lying north and south. Some of the graves contained as much as 3lbs. weight of gold objects, others none. The richest graves had the least pottery, and the huacas without gold the most pottery. Stone hatchets were also found associated with the gold objects and the pottery.

Most of the gold ornaments taken from the huacas were, probably, worn as ornaments, suspended around the neck of the person buried. Square, oblong, triangular, and circular plates of thin fine gold have also been met with. Nearly all the golden figures are alloyed with copper. Some of the most pure are 21⅜, and the least pure are not more than 11⅞ carats fine. The thin gold plates are about 21⅛ carats fine.†

* 'Account of a Visit to the Huacas, or Ancient Graveyards of Chiriqui.'—'Bull. Amer. Ethno. Soc.,' Nov., 1860, p. 28.

† 'Bull. Amer. Ethn. Soc.,' Oct., 1860, p 21.

The alloy of which the figures have been formed was prepared artificially, and is not native; the objects have been cast, and some have been finished by hammering.

Mr. John Evans has remarked that as a rule the gold in the personal ornaments of all nations was purer, or more alloyed, in proportion to their antiquity. There was, as civilisation increased, a strong tendency to make the same amount of show, with a less amount of the real metal. The gold ornaments found in the Chiriqui graves are of very base metal, indicative of their belonging to a late period in their acquaintance with gold among the people who formed them.* The Chiriqui graves have been considered to be from 700 to 800 years old.†

The largest gold figure, of high degree of purity, found in the huacal of Bugaba, weighed between eleven and twelve ounces. The largest figure obtained by the first exploring party at Chiriqui, in August, 1858, was that of an alligator; it weighed eight ounces and a half. Other gold figures, representing a cricket, a frog, a sea-shell, a man, and a jaguar were found at the same time.‡

It was on the north coast of Veraguas§ that the Spaniards met for the first time with pure gold, the natives wearing large plates of it suspended from their necks; they had likewise ornaments of gold of a low standard called "guanin," rudely shaped, which were likened to eagles, but were rather figures of the sacred "guacamayo," or parrot.‖

The pottery found associated with the gold figures was generally of finer quality than that in the other huacas.

The greater proportion of the earthen vessels are in a good state of preservation, the colours being, usually, bright and distinct. Stone arrow-heads and hatchets are found in the huacas of Chiriqui associated with the other relics, as well as stone corn-grinders, generally in the form of a puma, with its body expanded to an oval tablet form, and its tail curved so as to be connected with one of the hind legs, and thus to serve as a handle.

* 'Trans. Ethno. Soc.,' new series, vol. ii., p. 164.

† Bollaert, 'Trans. Ethno. Soc.,' new series, vol. ii., p. 164.

‡ 'Bull. Amer. Ethno. Soc.,' Oct., 1860, p. 21.

§ Verahua is said to have been the name of a chief here. Another derivation is that the waters of the Atlantic off the coast are green, and so the country was called by Columbus Verdes-aguas.

‖ W. Bollaert, 'Ancient Indian Tombs of Chiriqui.'—'Trans. Ethno. Soc.,' new series, vol. ii., p. 147.

Another variety is of circular form, supported by figures of monkeys, the whole carved out of solid stone, as are the puma corn-grinders.

The existence of huacals throughout the southern portion of the Isthmus and Central America has been long known to the inhabitants, but they do not appear to occur on the northern side of the Isthmus, from the lagoons of Chiriqui to the valley of the Changres. They appear to be found only upon the plain, valley, and upland of the Pacific side of the Isthmus.

STONE IMPLEMENTS, GOLD FIGURES, AND POTTERY FROM THE CHIRIQUI HUACAS ARE SHOWN IN CASES A 41, C 32, E 8, H 19, AND H 21.

E 8.

The pottery found in the Chiriqui graves is very far in advance of that made by the Northern Indians. Many of the vessels are tripods, and these, frequently, have movable clay pellets in the hollow legs, which produce a rattling sound. A similar idea has been adopted with No. 1, Case E 7, from Palenque. The pellet, however, in this specimen is placed in a hollow under the throat of the animal figure. The gold frog from Chiriqui, No. 31, Case A 41, has metal balls in the eye-cavities which rattle.

A number of musical instruments have been found in the Chiriqui graves; they are made of pottery, and are usually in the form of birds or animals. They range from one inch and a half to four inches and a half in length. The more perfect instruments have three finger-holes, to produce the first three notes of the major scale of F—F, G, A,

These whistles are usually painted in red and black on a cream-coloured ground.

There is no evidence of the use of the potter's wheel in Central America; the ancient processes have undergone little or no modification since the Conquest The pottery generally in use amongst all classes in Central America is of Indian manufacture, which, even at the present time, is fashioned entirely by hand.*

* Squier, 'Central America,' vol. ii., pp. 337, 338.

No. 1 (S and D 28).—Small globular vessel with lip, of brown ware, painted red and relieved with black lines.

No. 2 (S and D 44).—Small gourd-shaped vessel of brown ware, covered with a thick coating of white paint. Dr. Davis suggests that this object has been used as a lamp.

No. 3 (S and D 78).—Cast of a musical instrument (whistle) in the form of some quadruped. The original has been figured;* at that time it was in the Collection of Dr. Davis; it is now in the Museum of the American Ethnological Society. It is painted red and black on a cream-coloured ground, and measures nearly five inches in length. The whistle is at the tail of the animal.

No. 4 (S and D 77).—Cast of a whistle in the form of a bird, the whistle being at the tail. This object is similar in material and colouring to No. 3. The original is in the Museum of the American Ethnological Society.

No. 5 (S and D 75). Painted whistle in the form of an animal, of similar ware to Nos. 3 and 4. The whistle is in one of the fore legs. The note can be varied by closing some of the holes in the head and body of the animal-figure.

No. 6 (S and D 74).—Whistle ornamented with rude figures of animals. It may be remarked that the whistles Nos. 5 and 6 are coincident in pitch, the extreme sounds (from F to A) forming the interval of a major third.†

No. 7 (S and D 43).—Small painted double vessel, with handle, of similar ware to No. 5.

No. 8 (S and D 35).—Small painted vessel, standing upon three solid legs, of similar ware to No. 5. Many of the tripod vessels, from Chiriqui, have hollow legs, each containing one or more loose clay pellets.

No. 9 (S and D 76).—Small painted figure of an Indian, in a sitting posture, the ware similar to No. 5. This figure is pierced with nine holes.

No. 10 (S and D 73).—Whistle of brown ware, in the form of a bird, the whistle is at the tail. This whistle has all the characteristics of Nos. 5 and 6, but it is a major second higher in pitch.‡ As these objects must have altered considerably in burning, great practical skill is shown in their manufacture,

* Wilson, 'Prehistoric Man,' vol. ii., fig. 39, p. 107.

† The extreme sounds are precisely those of the cuckoo when in good note.

‡ The whistles in the Collection have been examined by my friend Mr. C. J. Read, to whom I am indebted for the information given.—E.T.S.

for, from the condition of the holes, it is evident that they were not tuned after being fired.

No. 11 (S and D 36).—Small vessel of brown ware, standing on three solid legs; it is ornamented with red paint, incised lines, and rude figures.

No. 12 (S and D 27).—Globular vessel of brown ware, with a lip and two ears at the side.

No. 13 (S and D 29).—Globular vessel with two handles; ornamented with red paint.

No. 14 (S and D 40).—Vessel in the form of an animal, standing on three solid legs, and ornamented with red and black paint.

No. 15 (S and D 27).—Globular vessel with two ears; the ears represent squatting human figures.

No. 16.—Globular vessel, ornamented with red and black paint.

No. 17.—Leg of a vase, in the form of a fish; it is hollow, and has a loose ball of clay inside to serve as a rattle.

No. 18.—Ornament of a vase; the under part shows that these clay ornaments were modelled apart from the vessel, and were then attached to it.

No. 19.—Globular vessel, with two ears in the form of human figures. This vessel is decorated with red paint.

Nos. 20 and 21.—Small globular vessels, without ears; they are decorated with red and black paint.

Nos. 16 to 21 were presented to the Collection by Captain Oliver Eldridge, of San Francisco.

No. 22 (S and D 33), No. 23 (S and D 32), No. 24 (S and D 34).—Three vessels of unpainted ware; they each stand upon three hollow legs, in which are loose clay pellets. These vessels are ornamented with grotesque heads of owls, &c.

No. 25 (S and D 26).—Globular vessel, with two ears in the form of animals. These ears are hollow, and have clay balls inside, which rattle.

No. 26 (S and D 38).—Globular vessel, with two ears, supported on three hollow legs, in the form of alligators ornamented with bosses, and having clay pellets inside them.

No. 27 (S and D 25).—Globular vessel of unpainted ware, with two ears in the form of animals.

No. 28 (S and D 39).—Boat-shaped vessel of fine unpainted ware; it has been ornamented with three figures, one of which only remains, representing the bust of an Indian who is leaning upon his elbows. The vessel appears to have stood upon *two* legs, both of which are gone.

No. 29 (S and D 31).—Jug-shaped vessel with handle, ornamented with red paint.

No. 30 (S and D 37).—Vessel with two twisted ears, standing upon three solid legs, and decorated with red paint in circles and lines.

No. 31.—Globular vessel of unpainted ware, originally with two ears, one of which remains. The vessel stands on three legs.

No. 32.—Globular vessel of unpainted ware, with two ears in the form of animals. This vessel is decorated with incised dots, circles, and lines.

No. 33.—Basin-shaped vessel of unpainted ware; it stands upon three hollow legs, having clay pellets inside them.

Nos. 31 to 33 were presented to the Collection by Captain Oliver Eldridge.

No. 34 (S and D 30).—Fragments of a globular vessel, with ears, of very fine ware. It has been decorated with red, black, and white paint.

H 19.

No. 9 (S and D 42).—Large globular vessel, having two ears, with "key-pattern" border painted in red and black.*

H 21.

No. 8 (S and D 41).—Globular vessel of unpainted ware, ornamented with a pattern round the neck.

A 41.

The objects in this Case Nos. 21 to 34 are from the *huacas* of Chiriqui. Nos. 23 and 26 have been presented to the Collection by Dr. Otis, Nos. 21 and 33 *a* by Captain Oliver Eldridge.

Nos. 21 to 25 are stone hatchets.† No. 26 is part of a spear-head of obsidian. Upon Tablet 27 (S and D 437, 439, 440) are three stone arrow-heads. Dr. Merritt has mentioned ‡ that the

* The "key-border," as a form of ornament, is quite common in Mexico and Yucatan. 'Anahuac,' p. 187.

† See notice on 'Stone Celts from Chiriqui,' by Charles Carter Blake, in 'Trans. Ethno. Soc.,' new series, vol. ii., pp. 166—169.

‡ 'Bull. Amer. Ethno. Soc.,' April, 1862, p. 14.

stone arrow-heads, found in the graves of Chiriqui, differ from all others he has seen, in being three-sided or pyramidal. He adds that he is not aware that any of the flat kinds, such as those found in various parts of America, and in other countries, have been met with in the Chiriqui *huacas*. Flint arrow-heads having a three-sided section, however, are found in Scandinavia;* they display far better workmanship than the Chiriqui arrow-heads.

Upon Tablet 28 (S and D, U 39) is an electrotype copy of a gold ornament, representing two human figures, nude, with the exception of a loin-cloth, each bearing a shovel-shaped weapon and a spear; they have ear-ornaments and necklaces, upon their heads are square-shaped head-dresses. The original is in the Collection of the Honourable Caleb Lyon.

Upon Tablet 29 (S and D, U 42) is an electrotype copy of a gold ornament in the shape of a frog. The original has been melted.

Upon Tablet 30 *a* (S and D, U 41) is an electrotype copy of a gold ornament in the form of a puma. The original is in the Collection of Dr. Merritt.

b (S and D, U 43) is a gold bell with a ring for suspension.

Upon Tablet 31 (S and D, U 37) is an ornament in the shape of a frog. The gold, of which this object is formed, is much alloyed with copper. There are balls of metal in the eye-cavities which produce a rattling noise. This specimen has evidently been cast; the feet and other parts show that they have been subsequently flattened by hammering. There are holes in the forefeet, by which this ornament could have been attached to the person.

Upon Tablet 32 (S and D, U 38) is an ornament of base gold in the form of a fish, having holes for suspension.

Upon Tablet 33 *a* is a small figure of base gold in the form of a puma.

Upon Tablet 34 (S and D, U 40) is an electrotype copy of a gold ornament in the form of a human figure, wearing a crown of serpents' heads. The original has been melted.

The quantity of gold obtained from the Chiriqui graves was very considerable. At the period of Mr. Power's visit, in August, 1859, about 250 lbs. weight of gold had been extracted from the *huacas* at Bugábita, two-thirds being tolerably pure gold, the remaining third being what is called "guanin" or gold

* See p. 212.

alloyed with copper; the value of the whole was about £12,500. The yield lasted from the beginning of July to the end of the month, after which it fell off. Dr. Duprée informed Mr. Bollaert that, in the summer of 1861, some fresh tombs were discovered, from which gold objects to the value of £16,000 had been extracted.* Dr. Duprée forwarded a number of gold ornaments and a collection of pottery, from the Chiriqui graves to Mr. Bollaert. Unfortunately the vessel was wrecked during the passage, and the under-mentioned gold objects were among the specimens thus lost:—

Grotesque figure of a man, weighing nine ounces and a half; found at Bugátiba.

Figure of a man, playing upon a pipe and jingling a bell, weighing over six ounces; found at Bajo Boquete, near the river Caldera.

Figure of a woman, containing two balls for rattling, one in the head, and the other in the body.

Figure of a puma, weighing six ounces and a quarter.

This Collection also included figures, in gold, of fish, frog, lizard, tapir, birds, and deer.†

The other metallic objects in this Case are for comparison.

Upon Tablet 35 *a* to *i* are figures in base gold from New Granada (Paris Exhibition, 1867). Upon Tablet 33 *b* (S and D, U 36) is a piece of sheet gold, which formed part of the wrapping of a mummy, found in Arica, Peru, in excavating for the railroad. Upon Tablet 36 (S and D, U 31) is an ornament, found in Peru, in the form of a fish, made of thin sheet silver; it has been cut with a very blunt tool, for the edges are still ragged. It formed one of many ornaments upon a mantle, trimmed with feathers, now in the Collection of the American Ethnological Society.

C 32.

Nos. 1 and 2 (S and D 565 and 458).—"Metatls"‡ of trachyte, each in the form of a carnivorous animal; from the Chiriqui graves. The upper part of the body is expanded into a flat table, upon which the maize was crushed with a roller or

* Bollaert, 'Ancient Indian Tombs of Chiriqui.'—'Trans. Ethno. Soc.,' new series, vol. ii., p. 153, and note.

† Bollaert, *l.c.*, pp. 152—154.

‡ "Metatl" is the Aztec name for this implement; the modern name is "metate."

pestle. The tail of the animal has served as a handle. The legs and sides of these objects are covered with sculptured ornament.

No. 3 (S and D 457).—Stone pestle* used with the above kind of corn-crusher. It was found with No. 2. No. 4, "Metatl" similar to Nos. 1 and 2; it has been presented to the Collection by Captain Oliver Eldridge.

Mr. F. Boyle, F.R.G.S., mentions that he found several carved stone "metatls," at Libertad, in some ancient cromlechs. He says that similar objects are still used in that part of America for grinding maize; but that the workmanship of the modern implements is not so good as that of the ancient specimens. The rolling-pins used with the tables were also found; they were bars of stone, flattened on either side.† Some American archæologists consider that the workmanship of these "maize-grinders" is of too elaborate a character to admit of our regarding them as mere household utensils for ordinary everyday use.‡ This remark has been made specially with reference to such highly-finished specimens as Nos. 1, 2, and 4 in this Case.

Nicaragua.

The Indians of the Atlantic coast of Nicaragua exist as a few, scanty, wandering tribes, maintaining a precarious subsistence by hunting and fishing, with little or no agriculture; they resemble the Caribs of the islands. In the more elevated and salubrious regions around the great lakes of the interior, and upon the slopes of the Pacific, the natives have many features in common with the semi-civilised nations of Mexico, Guatemala, and Yucatan.§

The Objects from Nicaragua are shown in Cases A 42 and E 8.

A 42.

Nos. 1 to 4.—Stone hatchets from Nicaragua, presented to

* This form of pestle is called "metalpile" (Aztec, "metlapilli," *i.e.*, little metatl).

† 'A Ride across a Continent,' p. 200.

‡ 'Bull. Amer. Ethno. Soc.,' Sept., 1860, p. 11.

§ Squier, 'Travels in Central America,' vol. ii., pp. 308, 309.

the Collection by Mr. F. Boyle, F.R.G.S. No. 1 is of an elegant form, it is made of milky quartz. Mr. E. G. Squier has figured and described two stone hatchets found in Central America. One of these (No. 8), of the ordinary wedge-shaped type, is of syenite, and was found near Granada, in Nicaragua. Similar implements are frequently met with in Nicaragua; they vary in size from three and four inches to a foot in length. The other specimen figured by Mr. Squier (No. 7) is of a green variety of quartz; the narrower end of the implement is ornamented with carving, representing the human figure, conventionally treated; it is highly polished. A drilled hole runs entirely through the implement parallel with the edge, but near the narrower end of the object, the cutting edge is slightly curved. This specimen is stated to have been found in an ancient grave, in Costa Rica, with others of similar material, but of larger size and ruder form; it probably should be classed as an amulet.*

Mr. John Evans possesses an amulet of granite in the form of a wedge-shaped hatchet; it was probably found in Central America, and measures three inches and a quarter in length. On one side of this object there is an incised representation of the upper part of a human figure with the arms resting upon the breast, on the other side are two holes for suspension. These holes have been drilled with a hollow tool, for a part of the central core is still to be seen attached at the base. The Indians in Central America, however, according to Mr. Squier, frequently drill stone, using only a stick with sand and water for the purpose. Mr. Gulick has seen the same mode of drilling practised by the natives of the Sandwich Islands.†

Pottery from Nicaragua.

E 8.

No. 35.—Vessel of black ware with two handles, and with a flat bottom.

No. 36.—Rattle of coarse ware, in the form of a grotesque human figure.

Nos. 37 and 38.—Gourd-shaped vessels of brown ware.

No. 39.—Vessel of brown ware, representing the human face

* 'Travels in Central America,' vol. ii., p. 339.

† 'Bull. Amer. Ethno. Soc.,' May, 1861, p. 7.

and figure. This vessel is decorated with red and black paint.

Nos. 40 and 41.—Vessels of black ware, with handle; each in the form of a bird, the beak serving for the spout. They are both flat at the bottom.

SALVADOR.

A 52.

Nos. 1 and 2 are two cores of obsidian, found near San Salvador. (Paris Exhibition, 1867.)

HONDURAS.

C 33.

The specimens Nos. 5 to 7 are three very remarkable flint implements. They have been thus described by Dr. Daniel Wilson. "Among the numerous stone weapons and implements which have been discovered, and serve to illustrate the primitive arts of the new world, three remarkable relics from the Bay of Honduras, in South America, are deserving of special attention. They were found about the year 1794, with other examples, in a cave between two and three miles inland. One of them was presented to the British Museum, and two others have been repeatedly exhibited at meetings of the Archæological Institute. One is a serrated weapon, pointed at both ends, measuring sixteen inches and a half long. Another is in the form of a crescent, with projecting points. It measures seventeen inches in its greatest length, and it is conjectured may have served as a weapon of parade, like the state partisan or halbert of later times. The third, which is imperfect, has probably resembled the previous one in general form. The whole are examples of implements wrought in flint, of unusually large proportions, and chipped with extraordinary regularity and skill." Dr. Wilson has figured these three specimens.*

They have also been described† and figured‡ in the "Archæological Journal." In this account it is stated that the specimens were found in 1810 by Captain William Stott, which

* 'Prehistoric Man,' vol. i., pp. 214, 215, figs. 7, 8.

† Vol. viii., p. 422.

‡ Vol. ix., p. 97.

corresponds with the history of the discovery given by Mr. Brackstone, in whose possession they were for about seventeen years. Mr. Brackstone says that *only* four specimens were found, and that these were given by Captain Stott, in 1811, to an old schoolfellow, Mr. Calvert, of Leeds. On the death of Mr. Calvert, in 1835, his son presented one of the specimens to the British Museum, and Mr. Brackstone purchased the other three of Mr. Calvert, jun., in 1851. They were added to the Blackmore Museum, with the other objects in the "Brackstone Collection," in 1867.

These Honduras specimens were thought to be unique until the three flint objects in this Case, Nos. 8 to 10, were obtained, in 1868, from the Rev. Charles Roe, through Mr. Prigg, jun., of Bury St. Edmunds, and it is probable, from the resemblance they bear to Nos. 5 to 7, both in material and workmanship, that they also were obtained from Honduras.

They have aged in the way to be expected from having remained for a long time upon the floor of a cave, perhaps resting upon a deposit of clay. The condition of the spear-head, No. 10, renders it probable that it was *entirely* buried in a bed of clay; the other two specimens have only aged upon one, the exposed, surface. Neither of the three objects present the appearance of flints which have remained exposed, for any length of time, to atmospheric and other influences, upon the surface of the soil.

These three implements were exhibited by the Rev. Charles Roe at a meeting of the members of the Suffolk Institute of Archæology and Natural History, at Bury St. Edmunds, May 22nd, 1868, and the following account of them has been published in the Quarterly Journal of that Society.* "Three implements of flint, viz., a spear-head, a saw, and a portion of a dentated disc, very rudely worked, but resembling somewhat those remarkable objects from a cavern near the bay of Honduras, South America, formerly in the possession of Mr. Brackstone, but now in the Blackmore Museum. No history was forthcoming of the stone objects exhibited by Mr. Roe, except that they were purchased with a lot of fossils, &c., at the sale of Mr. R. Blake's effects, of Rougham, and some hesitation was expressed as to their genuineness." Of the genuineness of these specimens, however, the Curators of the Blackmore Museum do not entertain the slightest doubt. No. 8 probably formed part of an im-

* January, 1869, p. 8.

plement resembling Nos. 5 and 6; No. 9 is deeply serrated at the edge like No. 7; it is scarcely probable that it was intended for use as a saw. No. 10 is a spear-head, in process of manufacture, the blade being in an unfinished state.

Mr. John Evans possesses a very nicely worked flint spear-head, six inches and a quarter in length, of an elongated leaf-shaped form, and a large obsidian core, from Comayaqua, Spanish Honduras; another spear-head, found at the same time, is now in the Christy Collection. Some stone "metatls,* standing on three legs, found in Honduras, have been figured.†

Guatemala.

A 42.

No. 5 (S and D 568).—Amulet of serpentine in the form of a human head; it is drilled at the back for suspension. Flattened globular drilled stones are found in Guatemala; these may have been used for arming clubs. Two such specimens were presented to the American Ethnological Society, in 1860, by Captain J. M. Dow.‡ Clubs armed with similar stones are used by the natives of the Salomon Islands.§

E 8.

No. 42 (S and D 66). Object in the form of a kneeling human figure, of coarse ware, found in Guatemala.

* See page 286.

† 'Archæologia,' vol. v., plate xxvi., p. 318.—Humboldt, 'Vues des Cordillères,' plate xxxix., p. 238.

‡ 'Bull. Amer. Ethno. Soc.,' Sept., 1860, p. 11.

§ See p. 95.

NORTH AMERICA.

Mexico.

Mr. Edward B. Tylor has made the following remarks upon the civilisation of the ancient Mexicans :—

The general resemblance presented between stone implements found in different parts of the world has often been cited in support of the theory, that this and other arts were carried over the world by tribes emigrating from one common centre of the creation of the human species. The argument has not much weight, and a larger view of the subject quite supersedes it. In Asia and in Europe the use of stone tools and weapons has always characterised a low state of civilisation; and such implements are chiefly found among savage tribes living by the chase, or just beginning to cultivate the ground, and to emerge from the condition of mere barbarians. If the Mexicans derived their civilisation from Europe, it must have been from some people unacquainted with the use of iron. Iron abounds in Mexico, not only in the state of ore, but nearly pure in aërolites of great size, as at Cholula, and at Zacatecas, so that ignorance of its qualities alone could have led to the neglect of this useful metal by the Mexicans. Not far from Huetamo, on the road towards the Pacific, there is a conical hill composed entirely of magnetic iron ore; it is so easily wrought that the blacksmiths in the neighbourhood, with no other apparatus than their common forges, make it directly into wrought iron, which they use for all ordinary purposes.

Civilisation, regarded as being transmitted from one country to another, must be measured by the height of its lowest point, as the strength of a chain is measured by the strength of its weakest link. The only civilisation, therefore, that the Mexicans can have received from the Old World must have been

from some people whose cutting implements were of sharp stone, and consequently, as we must conclude from analogy, some barbarous and ignorant tribe.

From this point the inhabitants of Mexico raised themselves, independently, to the extraordinary degree of culture which distinguished them when Europeans first became aware of their existence.

The curious distribution of their knowledge also shows that they found it for themselves, and did not receive it by transmission. They possessed a wonderful acquaintance with astronomy, even to such details as the real cause of eclipses, and the length of the year given by intercalations of surprising accuracy; and, at the same time, they had no knowledge whatever of writing alphabetically, for their hieroglyphics are nothing but suggestive pictures. They had carried gardening to a high degree of perfection; but, though there were two kinds of ox, and the buffalo at no great distance from them, in the countries they had passed through in their emigration from the north, they had no idea of the employment of beasts of burden, nor of the use of milk. They were a great trading people, and had money of several kinds in general use, but the art of weighing was utterly unknown to them; while, on the other hand, the Peruvians habitually used scales and weights, but had no idea of the use of money.*

The great number of antiquities found in Mexico has been often remarked. Mr. Tylor and his companion, the late Mr. Henry Christy, visited some caverns near the pyramids of Teotihuacan, from whence the stone used in building the pyramids had been quarried; they found the ground covered with pieces of obsidian knives and arrow-heads, and fragments of what seemed to have been larger tools or weapons; as well as numbers of hammer-heads, large and small, chiefly made of greenstone, some whole, but most broken.† Upon the ploughed fields in the neighbourhood they made repeated trials whether it was possible to stand still in any spot where there was no relic of Old Mexico within their reach; but this they could not do. Everywhere the ground was full of unglazed pottery and obsidian; and they even found arrows and clay figures that were good enough for a museum.‡

* 'Anahuac,' pp. 102, 103.

† Ibid., p. 137.

‡ Ibid., p. 147.

Stone Implements and other Objects from Mexico are shown in Cases A 42, C 29, C 30, E 7, E 9, and H 11.

A 42.

No. 6 (S and D, 434) and No. 7, Stone hatchets. No. 7 has been presented to the Collection by the Trustees of the Christy Museum. No. 8 (S and D, 438), Flint arrow-head. No. 9 (S and D, 564), Greenstone weapon; probably a stick was passed through the drilled hole, and it was used as a club. Somewhat similar drilled stones are used for arming clubs by the natives of the Salomon Islands.* No. 14, Grooved stone axe.

In the Christy Collection there is a most remarkable axe-head, having towards the butt-end the sculptured representation of a human figure, which exhibits little of the characteristic Aztec physiognomy. This specimen is made of green avanturine quartz, and measures about ten inches and a half in length.† Humboldt has figured an Aztec hatchet of jade, the surface of which is covered with hieroglyphics.‡ The original is in the Berlin Museum.

Some of the Mexican hieroglyphic pictures§ show us that hatchets both of bronze and stone were mounted in club-shaped wooden handles, corresponding with those in use among modern savages.

* See page 95.

† A. W. Franks, 'Guide to the Christy Coll.,' p. 19.

‡ 'Vues des Cordillères,' plate xxviii., p. 214.

§ See copies of these MSS. in Lord Kingsborough's great work upon the 'Antiquities of Mexico.'

Vol. i. 'Codex Telleriano-Remensis,' part 4, plate x.

Vol. ii. 'Mex. MS. (Laud)' Bodleian Lib., Oxford, plates xxiv. and xxviii.

Vol. ii. 'Bologna Codex,' plates xviii. and xxii. (probably bronze blades).

Vol. iii. 'Borgian Codex,' plates xiii., xx., xxxiv.—xxxvi. and lxviii.

Vol. iii. 'Dresden Codex,' plates xxxi.—xxxiv., xxxvi.—xliii, and lxvi. obably bronze blades).

Vol. iii. 'Mex. MS. (Fejérvàry),' plates vii., xvii., and xviii. (probably bronze blades).

A touchstone burnisher, and a greenstone chisel bruised at the butt-end from blows, both found in Tanhuitlan, have been figured.*

A thin, leaf-shaped flint spear-head, found at St. Stephen's, Tlascala, has been figured,† as have also a rude stone spear-head, with a triangular section, found near Tehuantepec,‡ and a stemmed and barbed flint arrow-head with a triangular section.§

A spherical stone, probably used as a sharpening stone for weapons, the surface of which is scored with grooves,‖ was found among some ruins near Tepexe. This object measures about four feet six inches in diameter, and has been figured.¶

The Aztecs used the bow and arrow both for hunting and for warlike purposes. A supply of arrows was usually carried in a skin-covered quiver, slung at the back of the archer. The stone arrow-head was sometimes attached to the shaft by a cross-binding of sinew,** or of twisted fibre.†† It was also frequently inserted in a cleft in the shaft.‡‡ Wooden arrows cut to a point, and with side notches, were also used.§§

The arrow-heads were triangular;‖‖ triangular hollowed at the base,¶¶ sometimes having long barbs;*** stemmed, with that expansion at the base so characteristic of American arrow-heads;††† and leaf-shaped.‡‡‡

The item, "8000 loads of canes of which they make arrows,"

* Kingsborough, *l.c.*, vol. iv., part 2, figs. 61 and 62, vol. vi., p. 443.

† Ibid., vol. iv., part 2, fig. 125, vol. vi., p. 465.

‡ Ibid., vol. iv., part 3, fig. 5, vol. vi., p. 468.

§ Ibid., vol. iv., part 2, fig. 58, vol. vi., p. 443.

‖ See notice of the "Stone of the arrows," p. 102.

¶ Kingsborough, *l.c.*, vol. iv., part 3, fig. 3, vol. vi., p. 467.

** Ibid., vol. i., 'Codex Telleriano-Remensis,' part 4, plate xxvii.

†† Ibid., vol. i., 'Mex. MS. (Selden, 3207),' plate ix.

‡‡ Ibid., vol. i., 'Codex Telleriano-Remensis,' part 4, plate xxxiii.

§§ Ibid., vol. i., 'Codex Telleriano-Remensis,' part 3, plates ii.—viii. Ibid., vol. ii., 'Vatican Codex,' plates xci., xciii.—xcix.

‖‖ Ibid., vol. i., 'Mex. MS. (Selden, 3207)', plate iii.—vi., and ix—xi. Ibid., vol ii., 'Vatican Codex,' plates xci., xciii.—xcix.

¶¶ Ibid., vol. i., 'Mendoza Codex,' plate lxvii., figs. 17, 18, and 21.

*** Ibid., vol. ii., 'Vatican Codex,' plates cxxxiv. and cxliv.

††† Ibid., vol. ii., 'Vatican Codex,' plate xc.

‡‡‡ Ibid., vol. ii., 'Vatican Codex,' plate xx. The man, who is represented as piercing his own tongue with an arrow having a leaf-shaped head, grasps a sheaf of similar arrows in his left hand.

which occurs in the tribute-roll in the Mendoza Codex,* is suggestive of the extensive use of arrows by the Mexicans.

The 'Mendoza Codex,' which is preserved in the Bodleian Library at Oxford, contains a roll of the cities of the Mexican empire, with the specific tributes exacted from them. It is a copy made after the Conquest, with a pen, on European paper.† An original painting of the same roll was in Boturini's Museum. The entire collection is transcribed in the first volume of Lord Kingsborough's 'Antiquities of Mexico.'‡ The 'Mendoza Codex' is the most important of the few Mexican manuscripts which have reached our time. It is divided into three parts; embracing the civil history of the nation, the tributes paid by the cities, and the domestic economy and discipline of the Mexicans.§

The principal cities, which had numerous villages and a large territory dependent on them, were distributed into districts, with each a share of land allotted to it for its support, and the inhabitants of each district paid a stipulated part of the produce to the crown.‖

Three hundred and sixty-three such districts paid tribute; some of these made their payments annually, some every six months, and others every eighty days. The quantities of the different articles exacted are expressed in the paintings by the usual hieroglyphics of numbers, placed above representations of the objects themselves.

C 29.

All the specimens in this case are from Mexico. The objects upon Tablets 1 to 13 have been presented to the Collection by the Trustees of the Christy Museum.

Upon Tablets 1 to 7, 9 *b* and *d*, 10, 11, and 14, are obsidian flakes. Such flakes as these were used by the Mexicans for arming wooden spears and swords, and for daggers. Some of their spears and arrows were tipped with copper or bronze, but the greater part of their weapons were armed with flakes of obsidian.

* Kingsborough, *l.c.*, vol. i., plate xliv., fig. 30, vol. vi., p. 35.
† 'Foreign Quarterly Review,' No. xvii., Art. 4.
‡ Prescott, 'Conquest of Mexico,' vol. i. p. 33. *Note.*
§ Ibid., vol. i., p. 86.
‖ Ibid., vol. i., p. 32.

Stone-armed Swords and Daggers.

Both edges of the Mexican wooden sword (maquahuitl) were set with flakes of obsidian, placed at a slight distance from each other, and inserted in a groove, or, according to Hernandez,* stuck into holes with a kind of gum. This weapon was intended for cutting, not for thrusting. The sharp *side* of the flakes was set outward, and must have formed a very keen edge; indeed, the formidable nature of the maquahuitl was frequently mentioned by the Spanish conquerors. Drawings of the Mexican obsidian-edged sword occur in abundance in the picture-writings,† and a specimen, having six flakes of obsidian on each side of the blade, is to be seen in a Museum in Mexico.‡

Nor was the use of this weapon confined to the Aztecs, for in the large canoe with its armed crew, first met off the coast of Yucatan, Herrera says that the Indians had "swords made of wood, having a gutter in the fore part, in which were sharp-edged flints strongly fixed with a sort of bitumen and thread." Among the ruins of Kabah, in Yucatan, Stephens discovered a large sculptured slab of stone, the carving upon which represents a man wearing a plume of feathers, in front of whom is another figure, in a kneeling posture, holding in his hands one of these toothed swords.§

In the western mounds of America flint flakes have been found lying side by side, like teeth, the row being about two feet long. It is probable that these flakes had been set in a wooden handle, which has perished.

An obsidian sword of a different kind is figured in the Selden MS. (3207).‖ It consists of a single flake of obsidian mounted

* 'Rerum Med. Nov. Hisp. Thes.,' Rome, 1651.

† Kingsborough, *l.c.*, vol. i., 'Mendoza Codex,' plate i., fig. 11, plate xliv., fig. 26, plate xlv., figs. 9—11, 14—16, 18, and 20, plate lxvi., figs. 1, 2, 4, and 6.

Vol. i., 'Codex Telleriano-Remensis,' part 3, plate iv.—viii., part 4, plate i., v., x., xi., xiv.—xvi., xx., xxv., xxvii., and xxviii.

Vol. i., 'Mex. MS. (Boturini),' plate xxi., fig. 22, and plate xxii.

Vol. ii, 'Vatican Codex,' plates lxxvi., xcv., xcix., cxxv., cxxvii., cxxxii., cxxxv., and cxxxvii.

‡ Col. A. Lane Fox, 'Primitive Warfare,' in 'Journ. Roy. United Ser. Institution,' Dec., 1867, p. 635.

§ Wilson, 'Prehistoric Man,' vol. i., pp. 225, 226. 'Anahuac,' p. 189.

‖ Kingsborough, *l.c.*, vol. i., plate ix.

in a cleft wooden handle; the split is long enough to enable the wood to serve as a central support or mid-rib for nearly the entire length of the weapon. As the point of the flake is broken off, this kind of sword could not have been used for thrusting; it must have been employed as a cutting weapon.

Another form of stone dagger with a pointed leaf-shaped blade is figured in the Mexican picture-writings. In the representation of a human sacrifice in the 'Vatican Codex,' the priest has cut open the breast of the victim with a knife or dagger of this kind.* It is also the form of knife used in a human sacrifice which is drawn in another Mexican MS.† In very many instances, however, it is represented as being used merely as an offensive weapon.‡ Sometimes a warrior is drawn bearing such a dagger in *each* hand,§ or with a dagger in one hand and a stone-headed spear in the other.‖ In one instance the pointed stone blade is represented as projecting, like a spike from a club.¶ In the 'Borgian Codex' a warrior is drawn carrying a stone dagger in his left, and a wedge-shaped hatchet, mounted in a wooden handle, in his right hand.** Other drawings of stone daggers are given in this MS.††

A pointed bone appears to have been in common use with the Mexicans as a dagger, and is constantly represented in the picture-writings.‡‡

Two weapons of a bill-hook form, and armed at the sides with spikes, are figured in the 'Borgian Codex;'§§ they somewhat resemble the weapons set with sharks' teeth, in use by the islanders of the Pacific.

* Kingsborough, *l.c.*, vol. ii., plate lxxvi. In this drawing four men hold the arms and legs of the victim.

† Ibid., vol. ii., 'Laud MS.' in the Bodleian Lib., Oxford, plate viii. In this instance the victim is placed upon a square block, which throws the chest forward. The priest is in the act of cutting out the heart.

‡ Ibid., vol. ii. 'Mex. MS. (Laud),' plates xvii., xx., xxiv., and xxviii.

§ Ibid., vol. ii., 'Mex. MS. (Laud),' plate xxii.

‖ Ibid., vol. ii., 'Mex. MS. (Laud),' plate xviii.

¶ Ibid., vol. ii., 'Mex. MS. (Laud),' plate xxix.

** Ibid., vol iii, plate xxxvi. The hatchet-blade is probably of bronze.

†† Ibid., vol. iii., plates xxxvii. and liv.

‡‡ Ibid., vol. ii., 'Vatican Codex,' plate lxxvii. In this plate a man is represented piercing his own tongue, and another man his own ear; each is inflicting this torture upon himself with a pointed bone dagger. Ibid., vol. iii., 'Borgian Codex,' plates xx., xxx., xxxvii., xl., lvii., and lxviii. Ibid., vol. iii., 'Mex. MS. (Fejérvàry),' plates xxi., xxii., xxxix., xl.

§§ Ibid., vol. iii., plate vi.

Stone-tipped Spears.

The Mexicans used javelins and darts armed at the point, and sometimes at the sides also, with flakes of obsidian. One kind of javelin had a thong attached to it, so that when thrown it could be pulled back, and used again by the thrower.*

Examples of spears with leaf-shaped, lozenge-shaped,† or triangular heads,‡ are represented in the Mexican picture-writings.

A spear with a triangular head, having the side-notches that are so characteristic of American arrow and spear-heads, is represented in one of the Selden MSS.§

In addition to spears headed with a single piece of stone or bronze, spears armed with flakes of obsidian at the top and for some distance down two sides of the shaft, were used by the Mexicans. The sharp edge of the flake was the part exposed; indeed, the weapon closely resembled the obsidian-edged sword already described, except that some terminated in a sharp point, whereas the sword was blunt at the end; the sword was for cutting only; some of the spears were used for both cutting and thrusting.‖ Representations of this cutting and thrusting spear occur in the picture-writings.¶

Another variety of this weapon is neither more nor less than an obsidian-edged sword, with a handle of the length of a spear-shaft. This weapon could not have been used for thrusting, for the top was blunt.** Some figures in the Selden MS. (3135) prove that it was used for cutting, for in the drawings††

* Prescott, 'Conquest of Mexico,' vol. i., p. 375.

† Kingsborough, *l.c.*, vol. iii., 'Dresden Codex,' plates lx., lxi., lxvii., and lxix., vol. i., 'Mex. MS. (Selden, 3207),' vol. i., plate ix.

‡ Ibid., vol. i., 'Borgian Codex,' plates xxxvii., lxi., and lxii.

§ Ibid., vol. i., 'Selden MS., 3207,' plate ix.

‖ When Guatemozin caused the swords taken from the Spaniards to be fastened to long poles, he merely improved upon the native cutting and thrusting obsidian-armed spear. The weapon may have been of a more formidable nature than that which preceded it, but Guatemozin did not originate the idea of a cutting and thrusting spear among the Mexicans, much less did he *introduce* the use of the long spear among his countrymen, as suggested by Prescott. See 'Conquest of Mexico,' pp. 354, 355.

¶ Kingsborough, *l.c.*, vol. i., 'Mendoza Codex,' plate lxviii., figs. 1—3, 9, 20—23, plate lxix., figs. 11—13.

Ibid., vol ii, 'Vienna Codex,' plate ix.

** Ibid., vol. i., 'Mex. MS. (Bodley, 2858)', plate xxviii.

†† Ibid., vol. i., plates vi., viii., xii., xiii., and xv.

warriors are represented fighting with these weapons, which they hold and use in a horizontal position; each combatant is endeavouring to wound his antagonist, not by striking, but by drawing the edge of the obsidian blades across the body, or still more frequently across the throat of his enemy.

Nor would such a weapon inflict a slight wound. The edge of an obsidian flake is very keen, and cuts like a sharp knife, as any incautious handler of a specimen will soon discover; indeed, obsidian flakes have been used instead of razors, for we learn that after the Spanish conquest "many, both regular and secular, clergy were shaved with them:"* it must be admitted that this was before steel razors became abundant in Mexico.

Warriors are also represented fighting with long spears, or clubs, armed on two sides with spikes, perhaps flakes of obsidian mounted, not sideways, but with the points outwards. These weapons, unlike those last described, are wielded like clubs, and were evidently intended for striking blows and not for cutting.† Probably, however, they were only intended to represent dentated clubs.

The Scandinavian bone harpoon-heads, already mentioned,‡ which are armed with flakes of flint in a similar manner to the Mexican cutting-edge obsidian spears, are chiefly found in Sweden, and measure from six to ten inches in length. They are usually grooved on both sides; sometimes, however, on one side only; in the groove or grooves small flakes of flint are placed at a short distance apart, with the edge of the flake outwards, and are fastened with bitumen.§

The Scandinavian harpoon-head was no doubt intended to be attached to a wooden shaft. The Mexican spear, however, consisted only of one part; the obsidian was fastened to the

* Torquemada, 'Monarquia Indiana,' Seville, 1615.

† Kingsborough, *l.c.*, vol. i., 'Mex. MS. (Bodley, 2858),' plate xxii., xxv., and xxviii.

‡ Page 218.

§ These heads of weapons are generally found in peat bogs in the south of Scania; they have been met with in the province of Bohusland on Tjörn (west coast of Sweden), and are said to have been found in the island of Öland. The longest specimen known to Professor Nilsson is in the Museum of the Academy of Antiquities at Stockholm; it measures ten inches in length, and was found in digging the Gotha canal, between Påfvelstrop and Tåtorp. Nilsson, 'Stone Age of Scandinavia,' pp. xlvi.—xlviii. A very perfect example of this kind of harpoon-head is in the Nash Mills Collection; it measures about eight inches and a half in length, and is armed on both sides with flint flakes set in grooves.

wooden shaft itself; in this respect it resembled the Australian quartz-armed spears in Case A 42.

Some of the Mexican spears represented in the picture-writings appear to be tipped with mere flakes of obsidian. Similar flakes are used by the natives of New Caledonia for arming their spears, examples of which may be seen in Case C 41, Nos. 5 and 6, and Case E 4, No. 35. These weapons appear to have perplexed some of the earlier voyagers, who described them as "long staves with very long sharpe things at the ends thereof, which (as we thought) were finnes of black fishes." *

Numerous as are the fragments of ancient obsidian weapons, and enormous as must have been the consumption of the material, yet the supply of obsidian in Mexico is almost exhaustless.† Before the conquest, the deposits at Cerro de Navajas, the "hill of knives," were regularly mined, and this place was the Sheffield of the country. The situation of the mines is very picturesque. Some of the trachytic porphyry of which the hill is composed has cooled from the molten state into a sort of slag or volcanic glass, which is the obsidian in question; and, in places, this vitreous lava—from one layer having flowed over another which was already cool—is regularly stratified. The mines are mere wells, not very deep, with horizontal workings into the obsidian where it was very good and in thick layers. Round about are heaps of fragments, amounting to hundreds of tons, and it is clear, from the shape of these, that some of the manufacturing was done on the spot. Numbers of pits have been sunk; and these "minillas," little mines, as they are called, furnish evidence of the importance of this material in the old Aztec civilisation. In the plains fragments of obsidian arrows and knives are to be found, literally at every step, mixed with fragments of pottery, and here and there a little terra-cotta figure.‡ So abundant is the material, that Mr. Tylor found it turned to the same account in Mexico as broken wine-bottles are with us, the wall of the hacienda at the Ojo de Agua being armed at the top with flakes of obsidian.§

* Purchas, vol. vi., p. 95.

† I am indebted to Professor Church for the following remarks:—"The obsidian of Mexico is of the most usual kind, generally known as 'volcanic glass.' Its chief ingredient is a felspar. Its specific gravity is rather low, one typical specimen in the Blackmore Collection being 2.361."—E. T. S.

‡ 'Anahuac,' p. 95, pp. 99 and 100.

§ Ibid., p. 95.

C 29.

Upon Tablets 8, 9 *a* and *c*, are obsidian cores.

Upon Tablets 11 *b*, 12 *b*, *c*, *e*, *f*, *g*, 13 *a* and *b*, are obsidian arrow-heads.

Obsidian arrow-heads of all the usual American types are found in Mexico. In the Christy Collection there is a remarkable flame-shaped stemmed arrow-head of obsidian, which was found at Teteohuacan; it has been figured.*

No obsidian scrapers are in the Collection, but in the Christy Museum there are four very fine obsidian scrapers, from Mexico, of the usual European spoon-shaped type. Another specimen is preserved in the British Museum.

Upon Tablet 12 *d* is an obsidian disc. A similar disc of bone, found in Mexico, is preserved in the British Museum. Discs of flint, resembling the obsidian disc 12 *d*, are found in Europe; see specimen *a* on Tablet 20, Case B 23, from Ireland. Other examples, found in Yorkshire, are shown in Case B 21, on Tablet 27 *a* and *b*.

Slings and Sling-stones.

Perhaps such discs as these may have been intended for use with some form of sling, for the ancient Mexicans used slings; the shepherds of Sandia, and some other pueblos of New Mexico, still use them with great dexterity.† Indeed, the aloe-fibre "honda," or sling, is to be seen hanging by dozens in the Mexican shops, and the goat-herds in the mountains are such skilful slingers, that they are said to guide their flocks by sending a stone to hit any wandering goat on whichever horn they please.‡

Discs, however, such as the obsidian specimen 12 *d*, would,

* 'Anahuac,' p. 96.

† Abbé Em. Domenech, 'Seven Years' Residence in the Deserts of North America,' vol. ii., pp. 272, 273.

‡ 'Anahuac,' p. 173. The expertness of the Balearic slingers has been mentioned at p. 73. Among the Jews the tribe of Benjamin excelled in slinging. In the time of the judges there were seven hundred Benjamites, who all of them used their left hand, and "could sling stones at an hair-breadth and not miss." (Judges, chap. xx., verse 16.) When David fled to Ziklag, he was joined by a party of Benjamites, who could use either the right hand or the left in *hurling* stones (perhaps with the hand) and shooting arrows. (1 Chron., chap. xii., verse 2.) David himself was an excellent marksman with the sling, as was shown by his killing Goliath.—Strutt, 'Sports and Pastimes,' p. 71.

probably, not have been thrown with a *ribbon-sling*. Smooth pebbles, or stones artificially shaped like those in Case C 41, Nos. 28 to 30 and E 4, Tablet 1, which are used by the natives of New Caledonia; the leaden *glandes* of the Romans, Tablet 3, Case E 4;* or terra-cotta sling balls, such as that from the hill of St. Louis, Carthage, upon Tablet 2, Case E 4; are all of the forms suited for throwing with the *ribbon-sling*.† Thin discs of flint, or obsidian, could have been thrown with greater advantage and precision with the *stick-sling*.

The *stick-sling* was "a yard or better in length, and about an inch in diameter; it was split at the top, so as to make an opening wide enough to receive the stone, which was confined by the re-action of the stick on both sides, but not strong enough to resist the impulse of the slinger. It required much practice to handle this instrument with any great degree of certainty, for if the stone, in the act of throwing, quitted the sling either sooner or later than it ought to do, the desired effect was sure to fail. Those who could use it properly cast stones to a considerable distance, and with much precision."‡

Another form of sling, apparently hitherto undescribed, combines the advantages of the *ribbon-sling* with those of the *stick-sling*. It consists of a stick with a string or strap attached at one end. The sling-stone is placed under this string, and

* See notice of sling-stones at pp. 66, 72—74.

† "The *ribbon-sling* consists of a string or strap, of the breadth of about one or two inches, and about three feet long. One end is twisted round the fore-finger of the right hand, the other is held between that finger and the thumb; the sling-stone is placed in the loop formed by the ribbon, and the sling is then swung round the head until the stone has obtained a sufficiently swift motion, when one end of the ribbon is let go, and the stone flies forward with immense speed through the air. Those who have long practised the use of this weapon are able to take a good aim with it. We see by this that sling-stones must be smooth, and, in preference, *oval*." Nilsson, 'Stone Age of Scandinavia,' p. 50. The *ribbon-sling* was sometimes provided with a loop at one end, through this the second finger was passed; at the other end was a tassel, which was allowed to fly loose in casting the stone. The stone used with this sling is represented as being of a spherical form, and a receptacle for it of an oval, or circular, shape was attached to the middle of the sling. See Strutt, 'Sports and Pastimes,' pp. 72, 73, figs. 14 and 15.

‡ Strutt, 'Sports and Pastimes,' p. 74. The *stick-sling* sometimes had a *hole* in the end, instead of a *slit*. "Such a sling is sketched in Lepsius's great work upon Egypt, where a man is represented, at whose feet lies a heap of small stones, and who holds in his hand a *stick-sling* of this description, which he appears to be using very actively in the fight."—Nilsson, 'Stone Age of Scandinavia,' pp. 49, 50.

between it and the stick at the point where they are attached to each other. The loose end of the string and the butt-end of the stick are grasped in the hand; the string, being pulled down tightly, retains the sling-stone in its proper position. Stones can be thrown with this form of sling with far greater precision than with either the *ribbon-sling* or the *stick-sling;* and the great objection to the *stick-sling*, the difficulty in regulating the precise moment at which the stone shall quit the slit, is obviated, for the moment the string is released the stone speeds to the mark.* In practice it has been found that a piece of pottery of a circular shape presents the best form for throwing with the combined *stick and ribbon sling* just described. The object to be thrown must be thin, nearly of equal thickness throughout; the circular shape also is requisite. The ancient flint and obsidian discs are well suited, in point of form, for use with this kind of sling.†

There is an analogy between this combined *stick and ribbon sling* and the *wamera*, used by the natives of Australia for throwing spears. The *wamera* is held in the right hand, and the projecting peg, at the opposite end, is fitted into a hole at the end of the spear, which latter is held in the left hand in the required direction, until immediately before the moment of throwing.‡

* I am indebted to my colleague, Dr. Blackmore, for the notice of this form of sling; he has frequently used it in his younger days; indeed, it was the form of sling generally used by himself and his schoolfellows.—E.T.S.

† Another kind of sling, "*staff-slynges*, that smyte well," was used chiefly in besieging cities, or in naval engagements; it consisted of a leathern bag attached to the end of a staff, about three or four feet in length. It was wielded with both hands, and stones of considerable weight were thrown with it. Strutt, 'Sports and Pastimes,' p. 73, fig. 16. This figure is copied from a drawing of the fourteenth century, in a MS. at Benet College, Cambridge.

‡ Col. A. Lane Fox, 'Primitive Warfare,' sec. ii., in 'Journ. Roy. United Serv. Inst.,' June 5th, 1868. The *wamera* may be said to double the length of the thrower's arm, and thus to increase the force with which the spear is launched at the mark. It is used on the north-west (Gregory's Expedition, 1861, 'Journ. Roy. Geograph. Soc.,' xxxii.), and south-west coasts of Australia (Oldfield, 'Aborigines of Australia,' in 'Trans. Ethno. Soc.,' vol. iii.), and Major Mitchell has noticed it in the east and central parts of the continent ('Expedition to the Interior of Eastern Australia,' in 'Journ. Roy. Geograph. Soc.,' vol. ii.). The throwing-stick is used in New Zealand (Darwin, 'Naturalist's Journ.'), and by the Esquimaux throughout the regions they inhabit. The Purus Purus of South America, who inhabit a district bordering upon a tributary of the Amazon, are the only other race known to make use of the throwing-stick. Another kind of spear-thrower is used in

The ancient Mexicans appear also to have thrown stones by hand * with great force and accuracy of aim; with these they greatly harassed the Spaniards.† Representations of warriors throwing stones by hand occur in the picture-writings.‡ The modern Mexican appears to be a good marksman with a stone; for the late Mr. Christy, when riding on the top of a diligence, near San Juan de Dios, observed that the driver had a large black leather bag, full of stones, on the foot-board before him, and whenever either of the nine mules showed the least inclination to shirk his work, a heavy stone went whizzing at him with unerring aim, always hitting him in some tender place.§

A stone for throwing by hand, in shape resembling the *glandes*, but of larger size, may be seen in Case E 4, No. 32; such stones are in use by the natives of Savage Island.

C 29.

Upon Tablet 15 are some stone amulets, drilled for suspension. Superstitious as the ancient Mexicans were, it seems very natural that amulets of every description should have been in common use among them; and indeed in all collections of Mexican antiquities there are numerous perforated idols, figures, or symbols, which probably were worn as amulets. The most common variety is a heart-shaped stone, similar to those upon

New Caledonia, Tanna, New Hebrides, and Central Africa; it consists of a thong with a loop for the finger. When not in use it is carried suspended from an armlet worn on the left arm. Prior to throwing the spear it is attached to the middle of the shaft. This mode of increasing the range of the spear was known to the ancients; the throwing-strap was called ἀγκύλη by the Greeks, and "amentum" by the Romans. A soldier throwing a spear with the "amentum" forms part of the subject of a mosaic, found at Pompeii, now in the Naples Museum (C. Vogt, cited by Desor, 'Les Palafittes,' p. 87). The use of the "amentum" is represented on an Etruscan vase (Sir William Hamilton's Etruscan vases, iii., pl. xxxiii. This figure is copied in Smith's 'Dic. Greek and Roman Antiq.' Hasta, p. 588). One of the effects produced by the use of the throwing-strap was, doubtless, the imparting a rotary motion to the spear, thereby adding to the accuracy of its flight. The range and velocity were also increased. From experiments, made at St. Germain, it appears that the range of a spear is almost doubled by the use of the throwing-loop (Verchère de Reffye, 'Les Armes d'Alise,' p. 15, in the 'Revue Archéologique,' quoted by Desor, 'Les Palafittes,' p. 87, fig. 77).

* See notice of stones for throwing by hand, pp. 73, 74.

† Prescott, 'Conquest of Mexico,' vol. i., p. 362, vol. ii., pp. 258, 289.

‡ Kingsborough, *l.c.*, vol. i., 'Codex Telleriano-Remensis,' part 4, p. 26. Ibid., vol. ii., 'Vatican Codex,' plate cxxxiii.

§ 'Anahuac,' p. 173.

Tablet 15; they are said to have been hung on the under lip of the deceased.*

Upon Tablets 16 and 17 are some amulets and beads of jade, serpentine, and other varieties of hard stone.

The Aztecs were very skilful in making, drilling, and polishing beads of green jade, and other hard kinds of stone. Messrs. Tylor and Christy saw, in a Collection at Tezcuco, some spherical beads of green jade, highly polished, as large as pigeons' eggs. They were found in an alabaster box, of such elaborate and beautiful workmanship, that the owner deemed it worthy to be presented to the wife of President Santa Ana.†

Strings of beads made of chalchihuitl, a kind of stone greatly valued by the Aztecs, formed part of the annual tribute sent from certain districts to the Mexican monarch.‡

Perforated masses of chalchihuitl, of an oval form, but larger than the ordinary beads, also formed part of the tribute.§ The beads were of two sizes; the larger were oval, and the smaller were of a globular form. Gold beads, round,‖ and with pendant ornaments,¶ were likewise sent every year as tribute, as also were lip ornaments of clear amber set in gold,** and similar ornaments of blue crystal set in gold.††

Lumps of clear amber,‡‡ and lumps of amber for incense, called xochiococtl,§§ were also sent.

In the British Museum, attached to a necklace of stone beads, from Mexico, is a grooved stone something like the specimens found in Lake Varese, and already described.‖‖ The

* Steinhauer, 'Catalogue of the Christy Collection,' p. 34.

† 'Anahuac,' p. 263.

‡ Kingsborough, *l.c.*, vol. i., 'Mendoza Codex,' plate xxxix., figs. 32—36, plate xlv., figs. 21, 22, 41—43, plate xlviii., figs. 34—37, plate xlix., figs. 10, 11, plate li., fig. 21, plate liv., figs. 26, 27, vol. vi., pp. 35.

§ Kingsborough, *l.c.*, vol. i., 'Mendoza Codex,' plate xlviii., figs. 38—40, vol. vi., p. 37.

‖ Kingsborough, *l.c.*, vol. i, 'Mendoza Codex,' plate xlviii., fig. 32, vol. vi., p. 37. Schoolcraft mentions that 'among the antiquities of Mexico are several strings of beads of solid gold.' 'Archives of Aboriginal Knowledge,' vol. iv., p. 448.

¶ Kingsborough, *l.c.*, vol. i., 'Mendoza Codex,' plate xlviii., fig. 33, vol. vi., p. 37.

** Kingsborough, *l.c.*, vol. i., 'Mendoza Codex,' plate xlviii., fig. 44, plate xlix., figs. 22 and 26, plate li., fig. 25, vol. vi., p. 37.

†† Ibid., vol i., plate xlviii., fig. 45, plate li., fig. 24, vol. vi., p. 37.

‡‡ Kingsborough, *l.c.*, vol. i., 'Mendoza Codex,' plate xlix., figs. 33, 34.

§§ Ibid., plate liii., fig. 20, vol. vi., p. 41.

‖‖ Page 183.

Mexican specimen, however, appears to be grooved upon *both* sides. Two bone combs, found in Mexico, are preserved in the British Museum. One of these combs is about six inches and a half in length, and is ornamented with carved figures. Although of more delicate workmanship, these specimens somewhat resemble the bone combs found in the pit-dwellings at Highfield and elsewhere, which have been already noticed.*

C 30.

Nos. 1, 2, 4, 5, 6, and upon Tablet 14 are human and other figures carved in alabaster.

No. 3 is a carving in stone representing an animal's head.

Upon Tablets 7 and 8 are some serpentine and jade beads.

Upon Tablet 9 is part of a polished mirror made from a nodule of iron pyrites. These so-called mirrors were frequently used for decorating the masks made by the Mexicans; two masks in the Christy Collection have the eye-balls of iron-pyrites polished. A mirror of iron pyrites has been figured;† it is drilled at the back, probably with the view of enabling it to be attached to a mask, or an idol. Mirrors of iron pyrites are preserved in the British Museum and in the Christy Collection.

Upon Tablets 10 to 13 are amulets, beads, and ornaments of shell. Marine shells of a red colour formed articles of tribute to the Mexican monarchs.‡

The specimens Nos. 1, 2, 4—6, 9, and 14 were presented to the Collection by the Trustees of the Christy Museum

H 11.

No. 1 is a miniature model in wax of the Aztec Goddess of War (or of Death), Teoyaomiqui. The original is carved out of a huge block of basalt, and stands about nine feet high, with a breadth of five feet six inches. Some antiquaries think that the figures on it are intended for different personages, and that it represents three deities—Huitzilopochtli, the god of war,§ Teoyaomiqui his wife, and Mictlanteuctli, the god of hell. It has necklaces of alternate hearts and dead men's hands, with death's heads for a central ornament. At the bottom of the

* Page 65.

† Kingsborough, *l.c.*, vol. iv., part 2, figs. 76, vol. vi., p. 446.

‡ Kingsborough, *l.c.*, vol. i., 'Mendoza Codex,' plate xl., figs. 25 and 26, vol. vi., p. 31.

§ Huitzilopochtli was also called Mixitl (or Mexitli), and it was in honour of this, their most esteemed, deity that the country was named Mexico.

block is a strange sprawling figure, which one cannot see now, for it is the base which rests on the ground; but there are two shoulders projecting from the idol, which show plainly that originally it did not stand on the ground, but was supported aloft on the tops of two pillars. The figure carved upon the bottom represents a monster holding a skull in each hand, while other skulls hang from his knees and elbows. His mouth is a mere oval ring, a common feature of Mexican idols, and four tusks project just above it. The new moon laid down like a bridge forms his forehead, and a star is placed on each side of it. This is thought to have been the conventional representation of Mictlanteuctli (Lord of the Land of the Dead), the god of hell, which was a place of utter and eternal darkness. Probably each victim, as he was led to the altar, could look up between the two pillars, and see the hideous god of hell staring down upon him from above.

There is little doubt that this is the famous war idol which stood on the great teocalli of Mexico, and before which so many thousands of human victims were sacrificed. It was found at a slight depth beneath the surface of the great square, on the 13th August, 1790, and was removed some time afterwards to the courtyard of the University. It was kept buried for many years after, lest the sight of one of their old deities might be too exciting for the Indians, who had plainly not forgotten it, as they secretly ornamented it with garlands of flowers while it remained above ground. It was only exposed to public view in 1821,* when it was disinterred at the solicitation of Mr. Bullock, who has described the effect produced upon the Indians when it was brought to light:—

"During the time it was exposed the court of the University was crowded with people, most of whom expressed the most decided contempt. Not so, however, any of the Indians. I attentively marked their countenances; not a smile escaped them, not even a word. In reply to a joke from one of the students, an old Indian remarked, 'It is very true we have three very good Spanish gods, but we might still have been allowed to keep a few of those of our ancestors!' And I was informed that chaplets of flowers were placed on the figure by natives who had stolen thither unseen in the evening." †

* 'Anahuac,' *l.c.*, pp. 223, 224. Brantz Mayer, 'Mexico as it was and as it is,' p. 114. Schoolcraft, *l.c.*, vol. vi., p. 585.

† 'Six Months in Mexico,' p. 11, quoted in Wilson's 'Prehistoric Man,' vol. i., p. 421.

The Aztec war god (or goddess) has been repeatedly figured.*

H 11.

No. 2 is a wax model of the Mexican calendar stone. The original is sculptured upon the face of a single block of basalt, which weighs between twenty and thirty tons. It is built into the base of one of the towers of the Cathedral at Mexico, in the Plaza Mayor, and passes by the name of "el Relox de Montezuma," or "Montezuma's watch." This vast mass of basalt measures eleven feet eight inches in diameter. †

The system of Mexican astronomy was, probably, derived from the Toltecs, the predecessors of the Aztecs. The year consisted of 365 days, with an intercalation of 13 days for each cycle of 52 years, which brought it to the same length as the Julian year of 365 days 6 hours. The wax model of this object, No. 2, is not absolutely correct. The artist observing that the circle of days would divide more neatly into sixteen parts than into twenty, has arranged his divisions accordingly, leaving out the four hieroglyphics which he considered the ugliest. ‡

The details made out at present on the calendar are as follows:—The summer and winter solstices, the spring and autumn equinoxes, the two passages of the sun over the zenith of Mexico, and some dates which possibly belong to religious festivals. The dates of the two zenith-transits are especially interesting; for, as they vary with the latitude, they must have been made out by actual observation in Mexico itself, and could not have been borrowed from some more civilised people in the distant countries through which the Mexicans migrated. This fact alone is sufficient to prove a considerable practical knowledge of astronomy.

Besides this, the Mexican cycle of 52 years seems to be indicated in the circle outside the signs of days; and also the days in the priestly year of 260 days; but to make these numbers we must allow for the compartments supposed to be hidden by the projecting rays of the sun.

The arrangement of the Mexican cycle of 52 years is very curious. They had four signs of years—*tochtli*, *acatl*, *tecpatl*,

* Humboldt, 'Vues des Cordillères,' plate xxix, figs. 1—6, pp. 214—219. Schoolcraft, *l.c.*, vol. vi., plate lv., p. 636. 'Anahuac,' *l.c.*, p. 221.

† Brantz Mayer, 'Mexico as it was and as it is,' p. 127.

‡ Anahuac,' pp. 237—239.

and *calli—rabbit*, *canes*, *flint*, and *house;* and against these signs they ranged numbers, from 1 to 13, so that a cycle exactly corresponds to a pack of cards, the four signs being the four suits, thirteen of each. Now, anyone would suppose that in making such a reckoning, they would first take one suit, count *one*, *two*, *three*, &c., in it, up to 13, and then begin another suit. This is not the Mexican idea. Their reckoning is 1 *tochtli*, 2 *acatl*, 3 *tecpatl*, &c., just as it may be made with the cards thus:—Ace of hearts, 2 of diamonds, 3 of spades, 4 of clubs, 5 of hearts, 6 of diamonds, and so on through the pack. The correspondence between the cycle of 52 years, divided among four signs, and our year of 52 weeks, divided among four seasons, is also curious, though as entirely accidental as the resemblance to the pack of cards, for the Mexican week (if we may call it so) consisted of five days instead of seven, which to a great extent nullifies the comparison.

The reckoning of days is still more cumbrous. It consists of the days of the week written in succession from 1 to 13, underneath these the 20 signs of days, and underneath these again another series of nine signs; so that each day was distinguished by a combination of a number and two signs, which combination could not belong to any other day.

The date of the year at the top of the calendar is 13 *acatl* (13 *canes*), which stands for 1479, 1427, 1375, 1323, and so on, subtracting 52 years each time. Now, why was this year chosen? It was not the beginning of a cycle, but the 26th year; and so, in ascertaining the meaning of the dates on the calendar, allowance has to be made for six days which have been gained by the leap-years only being adjusted at the end of the cycle; but this certainly offers no advantage whatever; and if an arbitrary date had been chosen to start the calendar with, of course it would have been the first year of a cycle. The year may have been chosen in commemoration of the foundation of Mexico, or Tenochtitlan, which historians give as somewhere about 1324 or 1325. The sign 13 *acatl* would stand for 1323. It is more likely that the date merely refers to the year in which the calendar was put up. As such a massive and elaborate piece of sculpture could only belong to the most flourishing period of the Aztec empire, the year indicated would be 1275, nine years before the building of the great pyramid close by.*

* 'Anahuac,' pp. 239, 240.

The "calendar stone" has been figured and described by Humboldt.*

H 11.

No. 3 is a wax model, to a reduced scale, of the so-called "sacrificial stone." The original is a cylindrical block of basalt, nine feet in diameter, and three feet in height, which now stands in the courtyard of the Museum at Mexico. It was found, in 1790, buried beneath the surface, in the great square, and when first discovered was overturned.†

The sacrificial stone has been described and figured by several authors.‡

It is probable that this was not one of the ordinary altars on which victims were sacrificed. These altars are thought to have been slabs of hard stone, with a protuberant part near one end, so that the breast of the victim was raised into an arch, which made it more easy for the priest to cut across it with his obsidian knife; but, though there were very many of these altars in different cities of Mexico, none are now known to exist. Mr. Squier believes that he has discovered three of these sacrificial altars in the island of Zapatero, Lake Nicaragua, one of which he has figured. He says of the first he discovered, "it was a rude block altered by art, and had beyond question been used as a stone of sacrifice. I afterwards found two others, clearly designed for the same purpose, but they had been broken."§

In the 'Vatican Codex' there is the representation of a human sacrifice, in which the victim is merely laid upon his back on the ground; the limbs are extended in the form of a St. Andrew's cross, four attendants, kneeling on one knee, firmly grasp the extremities with both hands, to prevent any shifting of position. No altar or sacrificial stone of any kind appears to be used in this instance. The priest is represented bending over the victim, holding a flint knife in his right hand, with which he has cut open the breast; blood flows freely from the incision. The priest's left hand is inserted in the wound, and holds the heart, which he appears to be

* 'Vues des Cordillères,' plate xxiii., pp. 125—194.

† Brantz Mayer, *l.c.*, p. 119.

‡ Kingsborough, *l.c.*, vol. iv., part iii., figs. 46, 47, vol. vi., pp. 484—486. Schoolcraft, *l.c.*, vol. vi., plate xxxv., p. 591. Humboldt, 'Vues des Cordillères,' plate xxi., pp. 118—121.

§ 'Travels in Central America,' vol. ii., p. 56.

about to sever from its attachment to the body with his flint knife.*

In another Mexican MS.† the victim is represented laid across a squared block of stone or wood, apparently about two feet in height and about eighteen inches in width. The head and arms of the victim fall over this block on one side, and the legs hang down on the other; the chest is consequently thrown upwards, and the priest is cutting it open with a flint knife.‡

Nothing, however, resembling the Mexican "sacrificial stone" is represented in the picture-writings as being used for human sacrifice. Humboldt considers it to be the stone described by early Spanish writers, and called *temalacatl* (spindle-stone), from its circular shape. Upon this the captive chiefs stood in the gladiatorial fights which took place within the space surrounding the great teocalli. Slightly armed, they stood upon this raised platform in the midst of the crowd of spectators; and six champions in succession, armed with better weapons, came up to fight with them. If the captive worsted his assailants in this unequal contest, he was set free with presents. This success was the lot of but few; the fate of most was to be overpowered and dragged off ignominiously, to be sacrificed like ordinary prisoners.

On the top of the stone is sculptured an outline of the sun with its eight rays, and a hollow in the centre, whence a groove runs to the edge of the stone, probably to let the blood run down. All round it is an appropriate bas-relief repeated several times. A vanquished warrior is giving up his stone sword and

* Kingsborough, *l.c.*, vol. ii., plate lxxvi. The priest and his four attendants are nude, with the exception of the loin-cloth. The hair of the priest is long, and is represented without ornament and falling loose down his back; the attendants have short hair, brushed upwards, a fillet is passed round the forehead, and in this a feather is worn. Three other human victims await the sacrificial knife; all four victims have their heads completely covered with white feathers; these appear to be the symbols of sacrifice. In the 'Mendoza Codex' (Kingsborough, vol. i., plate lxvii.), one of the messengers, sent by the King of Mexico to announce to a rebel Cacique the sentence of death which had been passed upon him, is represented ornamenting the prisoner's head with feathers. See Kingsborough, *l.c.*, vol. vi., p. 223, *note.*

† Kingsborough, *l.c.*, vol. ii. Laud MSS., plate viii.

‡ Unlike the sacrificing priest represented in the 'Vatican Codex,' the priest in the Laud MS. is completely clothed, and without attendants; neither is the head of the victim decorated with feathers, as in the 'Vatican Codex.'

his spear to his conqueror, who is tearing the plumed crest from his head.*

The above explanation by Humboldt is a plausible one. But in Central America altars not unlike this, and with grooves upon the top, stand in front of the great stone idols; and this curious monument may have been nothing after all but an ordinary altar upon which birds and small animals were sacrificed.†

The human sacrifice drawn in the 'Vatican Codex' perhaps may have been intended to represent the sacrifice of warriors defeated in one of these gladiatorial combats, for not only is the victim, whose heart is being cut out, dead, but the three others yet to pass under the sacrificial knife are laid upon the ground and are dead also;‡ in front of them is a Mexican champion, fully clothed, brandishing his maquahuitl and holding his shield. The three bodies are nude, with the exception of the loin-cloth, and even this appears to have been removed when the body was given up to the sacrificing priest. When ordinary victims were sacrificed, they were stripped to the waist, had their heads dressed with feathers, carried fans in their hands, and were compelled to take part in the religious dances which preceded the crowning act of the barbarous ceremony. They were then stretched one after another on the great stone of sacrifice. On its convex surface, their breasts heaved up conveniently for the diabolical purpose of the priestly executioner, who cut asunder the ribs with his obsidian knife, and, thrusting his hand into the wound, tore out the still-palpitating heart.§

Bernal Diaz thus describes the ceremony:—"On a sudden our ears were struck by the horrific sound of the great drum, the timbrals, horns, and trumpets, in the temple of the war god. We all directed our eyes thither, and, shocking to relate! saw our unfortunate countrymen driven by force, cuffs, and bastinades, to the place where they were to be sacrificed, which bloody ceremony was accompanied by the mournful sound of all the instruments of the temple. We perceived that when

* Humboldt, 'Vues des Cordillères,' plate xxi.

† 'Anahuac,' pp. 223, 224.

‡ Bernal Diaz says, "They open the body of the victim while living, with large knives of stone; they take out his heart and blood, which they offer to their gods."—'The True History of the Conquest of Mexico,' 1568, translated by Maurice Keatinge. 1800. p. 142.

§ Prescott, "Conquest of Mexico," vol. iii. p. 126. It is probable that the heart was not literally torn out, but cut out.

they had brought the unfortunate victims to the flat summit of the body of the temple, where were the adoratories, they put plumes upon their heads, and, with a kind of fan in the hand of each, made them dance before their accursed idols. When they had done this, they laid them upon their backs, on the stone used for the purpose, where they cut out their hearts, alive, and having presented them, yet palpitating, to their gods, they drew the bodies down the steps by the feet, where they were taken by others of their priests."*

In the Museum at Mexico there are some stone clamps, shaped like the letter U; it is thought that these were placed, reversed, over the wrists and ancles of victims to hold them down on the sacrificial stone. None of these clamps are, however, represented in the picture-writings as being used for such a purpose. A specimen, preserved in the Museum of Mexico, has been figured;† the "clamps" are usually of hard stone, very heavy, and covered with carvings. A fine "sacrificial clamp," made of mottled greenstone, is preserved in the Christy Collection, and has been figured.‡ It measures seventeen inches in length, and varies from fourteen to sixteen inches in width. The arms are four inches wide, and five inches deep; they are eight inches apart at about half their length.

The three models, Nos. 1 to 3, have been presented to the collection by the trustees of the Christy Museum.

The Mexicans were cultivating both maize and tobacco when the Spaniards invaded the country, and had done so for ages;§ the names of these plants, however, are derived from the language of Hayti, *mahiz* and *tabaco*,‖ where the Spaniards first met with them. Through a mistake the plant was called *tabaco*, that being really the name for the pipe with which it was smoked.

The custom of smoking tobacco existed in Mexico, where,

* 'The True History of the Conquest of Mexico,' p. 300.

† Schoolcraft, *l.c.*, vol. vi., pl. vi., fig. 7, p. 591.

‡ 'Anahuac,' p. 225.

§ The cultivation of maize, according to Humboldt, was found by the Europeans in the New World, from the south of Chili to Pennsylvania. —'Essai Politique,' tom. ii., p. 408.—He might have added, to the St. Lawrence. The Puritan fathers found it in abundance on the New England coast wherever they landed. — See Morton, 'New England's Memorial,' Boston, 1826, p. 68. Gookin, 'Massachusetts Historical Collections,' chap. iii. Prescott, 'Conquest of Mexico,' vol. i. p. 113, *note*.

‖ 'Anahuac,' p. 228.

however, smoking does not appear to have been invested with any of those singular conventionalities observed among the northern tribes of Indians.* Very few representations of tobacco-pipes occur in the picture-writings.†

The large series of smoking-pipes obtained from the mounds of Ohio is one of the leading features in the Blackmore Collection; it may not therefore be out of place to inquire into the origin of the custom of smoking tobacco, particularly as it bears upon the favourite idea of American ethnologists—the indigenous origin of the red race.‡

Tobacco.

It has been asserted that the use of tobacco in the East§ some centuries before the discovery of America is an historic fact. Fairholt‖ considers the "tradition" of the Greek Church, that Noah was intoxicated by tobacco, to have sprung from the brain of some pious humourist. He is equally incredulous as to the antiquity of the representation of a smoking party in an ancient tomb in Egypt, noticed by Dr. Yates. "China, that very safe country, where all investigators repose when their labours in every other are refuted, is now the 'happy home' whence the use of tobacco is declared to have emanated for the benefit of 'outer barbarians.'"

Setting aside all this, "about 1560" is the date generally assigned to the introduction of tobacco into Europe; a physician, Francesco Hernandez, brought it to Spain. Jean Nicot, Lord of Villemain, was sent as ambassador to the Portuguese Court, in 1559, and, while at Lisbon, he purchased some tobacco seed from a Flemish merchant who had obtained it in Florida. Nicot sent some to the Grand Prior of France, in honour of whom the plant was originally known as *Herbe du Grand Prieur*. When Nicot returned to France in 1561, he presented the Queen, Catherine de Medicis, with some of the plants, and its name was then altered, in compliment to her, to *Herbe de la Reine*, and *Herbe Medicée*. All these names ultimately were allowed to

* The Caribs and the South American tribes also smoked tobacco.

† 'Kingsborough,' *l.c.*, vol. iii., 'Borgian Codex,' plate lvii.—Ibid. vol. iii., Mex. MS. (Fejérvàry), plate xvii.

‡ See Wilson, 'Prehistoric Man,' vol. ii., pp. 49, 50.

§ See an account of the supposed use of tobacco in the East before the discovery of America, with a list of the authorities.—*Notes and Queries*, 1st Series, vol. ii., pp. 154—156, vol. vii., pp. 270, 271.

‖ 'Tobacco and its Associations,' pp. 43, 44, *note*.

fall into disuse for one constructed in honour of the original importer; thus *Nicotiana* became its recognised name, a word still preserved to us in *Nicotine*, the scientific name for the volatile and poisonous alkaloid which the tobacco-plant contains, and in *Nicotiana* the generic name of the plant. Italy received the gift direct from the hands of Cardinal Prosper Santa Croce, who obtained it in Portugal, and in honour of him it was called *Erba Santa Croce.**

Such prosaic accounts of the advent of tobacco may satisfy the unimaginative. The Red Indian, however, seeks to find a divine origin for tobacco, whilst the Mahometan regards it as a direct gift from his Prophet.† The Susquehannah Indians say that "in the beginning we had only flesh of animals to eat; and if that failed, we starved. Two of our hunters having killed a deer, and broiled a part of it, saw a young woman descend from the clouds, and seat herself on a hill hard by. Said one to the other: 'It is a spirit, perhaps, that has smelt our venison; let us offer some of it to her.' They accordingly gave her the tongue; she was pleased with its flavour, and said: 'Your kindness shall be repaid; come here thirteen moons hence, and you shall find your reward.' At the expiration of

* Fairholt, 'Tobacco and its Associations,' pp. 45, 46.

† As Mahomet was passing through the desert in winter, he found a poor viper almost frozen to death; touched with compassion, he lifted it from the earth and placed it in his sleeve, where the warmth and glow of the blessed body restored it to life. No sooner did the ungrateful reptile feel revived, than it poked forth its head, and said:—

"O, prophet, I am about to bite you."

"Give me a sound reason, O snake, and I will be content."

"Your people kill my people."

"Your people bite my people," replied the prophet; "the balance between our kindred is even; between you and me, it is in my favour, for I have done you good."

"And that you may not do me harm, I will bite you."

"Do not be so ungrateful."

"I will. I have sworn by the Most High that I will."

At the mention of that name the prophet no longer opposed the viper, but bade him bite on, in the name of God. The snake struck his fangs into the blessed wrist: the prophet not liking this, shook off the reptile, but did it no further harm, nor would he suffer those near him to destroy it; then placing his lips to the wound, he sucked out the poison, and spat it upon the earth. From these drops sprang the plant, tobacco, which has the bitterness of the serpent's tooth, quelled by the sweet saliva of the prophet.—Hon. F. Walpole, 'The Ansayrii and the Assassins,' quoted by M. C. Cooke, 'The Seven Sisters of Sleep,' pp. 19, 20.

the appointed time they returned, and found maize growing where her right hand had rested; where her left hand had touched the ground beans were growing; and where she had sat they found tobacco.*

The word *tabaco*, as already mentioned, appears to have been the name of the tube through which the Indians inhaled the smoke of the plant.†

Oviedo, in describing the habit of smoking among the Indians of Hispaniola,‡ says that the fumes were inhaled through the nostrils by means of a hollow forked cane, in one piece, shaped like the letter Y, and he describes it as "about a span long; when used the forked ends are inserted in the nostrils, the other end being applied to the burning leaves of the herb. . . This implement is called *tabaco* by the Indians;" and Oviedo particularly mentions that that name is *not* given to the plant.§ After citing the above passage, Fairholt quotes from another work,‖ to show that the pipe and not the plant was called *Tobago*,¶ and that the island Tobago was so named because in form it was thought to resemble the Y-shaped pipe.** Nothing, however, tends more completely to prove the antiquity and the universality of the use of tobacco throughout the continent of America, than the totally distinct and diverse names by which it was designated in the various languages of the Indian tribes.††

Fairholt says‡‡ that it bore the name of *yoli*, *petun*, *piecelt*, or *cohiba*, according to the varied language of the different tribes.

* Fairholt, *l.c.*, p 21.

† Ibid., pp. 44, 45.

‡ 'Historia General de las Indias,' 1526; enlarged 1535.

§ 'Tobacco and its Associations,' pp. 14—16.

‖ 'Tobago; or, a Geographical Description, &c., of that Famous Island,' 2nd ed., p. 74.

¶ The Spaniards now spell the word *tabaco*; the Portuguese and Italians, *tabacco*; the English, *tobacco*; the Poles, *tabaka*; the Danes and Swedes, *tobak*; the Germans, Dutch, and Russians, *tabak*; and the French, *tabac* —Fairholt, *l.c.*, p. 46, *note*.

** The Rev. Isaac Taylor, on the other hand, says that the general estimation in which the growth of *Tobago* was held has caused the name of this island to become the general designation of the "herbe."—'Words and Places,' p. 409. He adds that there is also a province of Yucatan called *Tabaco*. Adelung thinks that the word *tobacco* is not derived from either of these local names, but *vice versâ*; the word may, perhaps, be derived from the Haitean *tambaku*, a pipe.

†† Wilson, 'Prehistoric Man,' vol. ii., p. 2.

‡‡ 'Tobacco and its Associations,' pp. 44, 45.

Dr. Wilson mentions that the plant was called *kohiba*, *petun*, *qutschartai*, *uppówoc*, *apooke*, and, indeed, that almost every ancient and modern tribe had a different name for the plant.*

Another writer says that in Mexico it is called *yetl;* in Peru, *sagri.* In North America the Algonkin name is *sema;* the Huron, *oyngoua;* and the Chippewa, *asamah.* In South America the Omagua call it *petema*, the Maypure, *jema;* the Chiquito, *pâis;* the Vilela, *tusup;* and the Tamanac, *cavai.*†

In the narrative of the second voyage of Columbus, in 1494, we learn from Roman Pane, the friar who accompanied him, that the Hispaniolan name of tobacco was *cogiaba*, a word spelt by other travellers *cohiba.* It was known as *petun* in Brazil,‡ and as *piecelt* in Mexico.

Hariot, who joined the expedition of 1584, under Sir Walter Raleigh, states that the Indians of North America regard tobacco as a direct gift from the Great Spirit for their special enjoyment; indeed, they believe that the Great Spirit himself indulges in smoking tobacco. The pipe was therefore a sacred object, and smoking partook of the character of a moral, if not a religious act. Hariot says that—"There is an herbe which is sowed apart by itselfe, and is called by the inhabitants uppówoc; in the West Indies it hath diuers names, according to the seuerall places and countreys where it groweth and is used; the Spanyards generally call it tobacco. The leaues thereof being dried and brought into pouder, they use to take the fume or smoake thereof, by sucking it through pipes made of clay, into their stomacke and head. This uppówoc is of so precious estimation amongest them that they thinke their gods are marvellously delighted therewith; whereupon sometime they make halowed fires, and cast some of the powder§ therein for a sacrifice. Being in a storme uppon the waters, to pacifie their gods, they cast some up into the aire, and into the water; so a weare for fish being newly set up, they cast some therein, and into the aire; also after an escape of danger they cast some into the

* 'Prehistoric Man,' vol. ii., p. 1.

† M. C. Cooke, 'The Seven Sisters of Sleep,' p. 21.

‡ De Bry, 'Historia Brasiliana,' 1590.

§ "The salvages here dry the leaves of this *apooke* (tobacco) over the fier, and sometymes in the sun, and crumble yt into *poudre*, stalks, leaves, and all, taking the same in pipes of earth, which very ingeniously they can make." —'The Historie of Travaile into Virginia Britannica,' published by the Hakluyt Soc., from the original MS. of William Strachey, first secretary to the colony, and supposed to have been written between 1610 and 1612.

aire likewise; but all done with strange gestures, stamping, sometime dauncing, clapping of hands, holding up of hands, and staring up into the heavens, uttering therewithal and chattering strange words and noises."*

In the voyage of Sir Francis Drake† it is mentioned that some of the North American Indians "brought a little basket made of rushes, and filled with an herbe which they called *Tobah;*" and Drake afterwards adds, "they came now the second time to us, bringing with them as before had been done, feathers and bags of *Tobah* for presents, or rather indeed for sacrifices, upon this persuasion that we were gods."‡

Nor were such religious associations with the favourite narcotic confined to the northern continent. Among the Peruvians the cocoa plant took the place of tobacco; not only were leaves of the cocoa burnt as sacrifice to the gods, but even now, in the mines of Cerro de Pasco, the Indian throws masticated cocoa on the hard veins of metal, in order to propitiate the gnomes of the mine, who, it is believed, would otherwise render the mountains impenetrable; and leaves of the cocoa plant are still secretly placed in the mouth of the dead to solace him in his passage to another world.§

The use of tobacco for smoking was very general in Central America at the time of the discovery.

An early writer says, "It has happened to me several times that, going through the provinces of Guatemala and Nicaragua, I have entered the house of an Indian who had taken this herb, which in the Mexican language is called *tobacco*, and immediately perceiving the sharp fetid smell of this truly diabolical and stinking smoke, I was obliged to go away in haste and seek

* 'A Briefe and True Report of the New Found Land of Virginia,' 1588, quoted by Fairholt, 'Tobacco and its Associations,' pp. 22, 23. Hariot adds. "We ourselves during the time we were there used to suck it after their manner, as also since our returne, and have found many rare and wonderful experiments of the vertues thereof; of which the relation would require a volume by itselfe; the use of it by so manie of late, men and women, of great calling as else, and some learned phisitions also, is sufficient witnes." In Spenser's 'Faerie Queene,' the chaste Belphœbe, who has come to the succour of the wounded Timias, is learned in the virtue of herbs beneficent, and one of those which are specified by the poet, is "divine Tobacco." Book iij., Canto 5, stanza 32.

† 'The World Encompassed,' London, 1628. The voyage commenced 1572, and ended August, 1573.

‡ Quoted by Fairholt, *l.c.*, p. 23.

§ Wilson, 'Prehistoric Man,' vol. ii., pp. 10, 11.

some other place."* Nor has the modern race renounced the ways of their ancestors, for, according to Mr. Squier, the usual dress of the urchins in Nicaragua, under fourteen years of age, consists of a straw hat and a cigar.

Francisco Lopez de Gomara, who was chaplain to Cortez, when he made the conquest of Mexico, in 1519, speaks of smoking as an established custom among the people; and Bernal Diaz relates that Montezuma, after he had dined, had his pipe brought with much ceremony. "After he (Montezuma) had dined, they presented to him three little canes, highly ornamented, containing liquid amber, mixed with a herb they call tobacco; he took a little of the smoke from one of these canes, and then laid himself down to sleep."†

The smoking of tobacco by the northern Indian tribes, however, was not a mere sensual enjoyment; it was connected with the idea of sacrifice or propitiation. Upon this point more will be said hereafter.

Maize and Mealing-Stones.

The cultivation of maize, as already mentioned, was extensively practised by the Mexicans. Chests of maize are among the articles represented in the tribute-roll of the 'Mendoza Codex;' indeed, the aggregate of the annual tribute of maize, frijoles (beans), and *huauhtli*‡ amounted to about 600,000 bushels.§

There are, unfortunately, no Mexican mealing-stones in the Collection. The picture-writings contain representations of ancient Mexican mealing-stones, and travellers give us information as to the modern corn-crushers in use in Mexico. These serve to throw considerable light upon the large series of mealing-stones in the Collection from other parts of America.

In the Christy Museum there are two models, brought from Mexico by the late Mr. Christy, which show us the kind of handmill in present use in that country.

One of these is a terra-cotta model of a stone basin standing

* Girolamo Benzoni, 'History of the New World,' translated from the Venetian edition of 1573, by Rear-Admiral Smyth, for the Hakluyt Soc., 1857. Quoted by Fairholt, 'Tobacco and its Associations,' pp. 19, 20.

† 'The True History of the Conquest of Mexico,' 1568, translated by Maurice Keatinge. 1800. p. 140.

‡ *Huauhtli* is an indigenous grain which abounds in Michoacan.—'Anahuac,' p. 156.

§ Albert Gallatin, 'Notes on the Semi-Civilised Nations of Mexico, &c.' in 'Trans. Amer. Ethno. Soc.' vol. i., p. 119.

on three legs, with a stone pestle for bruising the maize. The other is the model of a woman preparing "tortillas" upon a sloping stone; she is represented as using a stone rolling-pin for reducing the grain. Similar stone rollers (metalpiles) may be seen in Case C 33. A miniature model of a mealing-stone of the kind described, with a model of the pestle used with it, may be seen in Case C 19, No. 10. Mr. Squier has given an engraving of "Las Tortilleras," in which a grinding stone of this sloping variety is introduced.* Mr. Tylor has figured a Mexican grinding-stone standing on four legs;† he mentions that these mealing-stones are regular articles of merchandise in the markets. "The 'metatl' is a sort of little table, hewn out of the local basalt, with four small feet, and its surface is curved from the ends to the middle. The 'metalpile' is of the same material, and is like a rolling-pin."‡

Mr. Squier has figured an ancient "metatl," dug up at Leon during his residence there. It stands on three legs, and is enriched with carving; he says, "the form is unchanged to this day, although few are as elaborately ornamented as that here introduced, which is a favourable specimen of aboriginal carving."§ He tells us that the tortilla is an aboriginal invention and that he "cottoned to it from the start," always preferring it to the native bread, which, although light and fair to the eye, is invariably spoiled by sweetening. Mr. Tylor says "tortillas are like oat-cakes, but made of Indian corn meal, not crisp, but soft and leathery." He says of himself and his travelling companion, the late Mr. Christy, "We thought them dreadfully nasty for a day or two; then we could just endure them; then we came to like them; and before we left the country we wondered how we should do without them."‖ Tortillas are made of maize, which has been shelled, soaked in alkali to remove the hull, and then carefully and repeatedly washed in cold water. It is afterwards reduced to extreme fineness on a "metatl." A very little cheese is ground with it, to give it consistency.¶ A roll is then taken in the hands, beaten

* 'Travels in Central America,' vol. ii., p. 195. This plate appears to be a copy of one published by Brantz Mayer in 'Mexico as it was and as it is,' p. 17.

† 'Anahuac,' p. 201.

‡ Ibid., p. 88. See ante, pp. 286, 287.

§ 'Travels in Central America,' vol. i., p. 273.

‖ 'Anahuac,' p. 38.

¶ This addition of cheese must be an innovation; cheese, of course, could not have entered into the composition of the aboriginal tortilla.

into a flat cake,* placed on an earthen pan, already heated upon the fire. When sufficiently done upon one side, it is adroitly turned on the other, and is finally served hot and crisp at the table.† It would seem that the cooks of Central America surpass those of Mexico in making "tortillas"; at all events the "hot and crisp" Nicaraguan tortilla strikes us as having a more appetising sound than the "soft and leathery" Mexican tortilla described by Mr. Tylor. Indeed the experience of the two travellers proves the superiority of the Nicaraguan tortilla; for it was Mr. Squier, and not Mr. Tylor, who "cottoned to the tortilla from the start." Mr. Brantz Mayer tells us that, in Mexico, the sellers of these tough buckskin-like victuals, sit in lines along the kerb of the side-walks with their fresh cakes in baskets covered with clean napkins to preserve their warmth. There they wait patiently for purchasers; and as "tortillas" with a little *chilé* or red pepper boiled in lard, are indispensable at least twice a day for the mass of the people, they are quite sure of a ready sale. With the Mexicans there is scarcely such a thing as domestic cookery. The labourer sallies forth with his *clacos* in his pocket, two or three of which will purchase his cakes from an Indian woman. A few steps further on, another Indian woman has a pan boiling over a portable furnace, and containing the required beans, or *chilé*. The hungry man seats himself beside the seller—makes a breakfast or dinner table of his knees—holds out his "tortilla," spread flat on his hand, for a ladle of *chilé*, and a lump of meat —then doubles up the edges of the cake sandwich fashion—and so eats on until his appetite is satisfied. He who is better off in the world owns a clay platter. Into this he causes his frijoles, or *chilé* and meat, to be thrown, and making a spoon of his "tortilla," gradually gets possession of his food, terminating the repast by eating the spoon itself.‡ Spoons, we are told, are

* "Hearing a continual slap, slap, slap, I looked round and saw a woman kneeling upon the ground, rubbing the 'metatl,' while a pretty girl was slapping a tortilla between her hands."—Olmsted's 'Texas.'

† 'Travels in Central America,' vol. i., pp. 272, 273. "The corn for the tortillas is boiled with a little lime in the water, until the outer husk or shell is peeled off, when it is ground upon an oblong stone called a metatl, a domestic utensil handed down from the aboriginal inhabitants. The meal is then properly mixed and seasoned and cooked upon small sheets of iron or copper. They are baked very thin, and are always served up hot."—Davis, 'El Gringo,' p. 341.

‡ 'Mexico as it was and as it is,' pp. 16, 17.

seldom met with, even in the houses of the rich; the use of the tortilla in lieu of them being universal.*

The "tortilla" is represented in the 'Mendoza Codex' in a series of drawings showing the education of Mexican boys and girls, as prescribed by law, and the quantity of food required to be given them at different ages. Children of three years of age were to be allowed half a tortilla at each meal.† At the age of four years the quantity was to be increased to one tortilla a meal.‡ At six, to one and a half.§ At thirteen, to two tortillas a meal.‖

These pictures, moreover, bring before us the entire course of instruction of Mexican children. When her daughter is four years of age, the mother is represented as showing her the distaff and spindle.¶ At five the girl is being instructed in the mode of using the spindle.** At six and seven years of age the girl is represented spinning.†† When she has attained the age of eight, the mother is seen reproving her negligent daughter and threatening her with punishment.‡‡ At nine this punishment is carried into effect, the mother being represented as pricking the palms of the girl's hands with thorns of the aloe.§§ At ten years of age the girl has her hands tied and is being beaten with a stick.‖‖ At eleven, she is undergoing the cruel punishment of having her head held over the smoke of burning capsicums.¶¶ At the age of twelve, for punishment, the girl is made to rise before break of day and to sweep the house.***

At thirteen, she is being taught by her mother to grind maize

* Ruxton, 'Adventures in Mexico,' p. 145.

† Kingsborough, *l.c.*, vol. i., 'Mendoza Codex,' plate lix., figs. 2—7, vol. vi., pp. 55, 56.

‡ Ibid., vol. i., plate lix., figs. 8—20, vol. vi., pp. 57, 58.

§ Ibid., vol. i., plate lix., figs. 21—26, plate lx., figs. 1—30, plate lxi., figs. 1—17, vol vi., pp. 58—61.

‖ Ibid., vol. i., plate lxi., figs. 18—36, vol. vi., pp. 61, 62.

¶ Ibid., *l.c.*, vol. i., 'Mendoza Codex,' plate lix., figs. 11—13, vol. vi., pp. 57, 58.

** Ibid., vol. i., plate lix., figs. 18—20, vol. vi., p. 58.

†† Ibid., vol. i., plate lix., figs. 24—26, plate lx., figs. 5—7, vol. vi., p. 59.

‡‡ Ibid., vol. i., plate lx., figs. 13—15, vol. vi., pp. 59, 60.

§§ Ibid., vol. i., plate lx., figs. 21—23, vol. vi., p. 60.

‖‖ Ibid., vol. i., plate lx., figs. 28—30, vol. vi., p. 61.

¶¶ Ibid., vol. i., plate lxi., figs. 6—9, vol. vi., p. 61.

*** Ibid., vol. i., plate lxi., figs. 15—17, vol. vi., p. 61. The punishments of boys were similar to those of girls, except that aloe thorns were run into various parts of the body instead of merely into the palms of the hands

upon a "metatl," and to make tortillas.* At fourteen, she is learning to weave.†

One very important thing in these pictures is that they give us representations of the modes of grinding maize, and of spinning and weaving employed by the ancient Mexicans. The end of the spindle is represented as resting in a socket fitted to the centre of a square block, as already described ;‡ this doubtless tended to steady the motion of the spindle. The writer of this notice believes that this contrivance is purely American. The "metatl" represented in the "Mendoza Codex," rests upon legs, and slopes away from the grinder; the maize is being crushed with a rolling pin. The form of the loom is of the most simple description; the girl is represented in a kneeling posture whilst spinning, weaving, or corn-grinding.

An inspection of the specimens in the Blackmore Museum alone would convey an inadequate idea of the state of art to which the ancient Mexicans had attained. This branch of American archæology, however, is admirably illustrated by the series in the Christy Museum. In this remarkable Collection, one group of objects demands more than a mere passing notice.

Aztec Mosaic-work.

The distinctive feature of some of the ancient Mexican objects, which have reached our time, is that they are incrusted with mosaic of turquoise,§ cut and polished, and fitted with extreme nicety—a work of great labour, time, and cost in any country, and especially so amongst a people to whom the use of iron was unknown. This mosaic-work is executed with such skill that

('Mendoza Codex,' plate lx., figs. 17—20.) At twelve years of age, the boy was punished by being tied hand and foot and was laid naked on the ground in some damp place; in this condition he was allowed to remain for an entire day ('Mendoza Codex,' plate lxi., figs. 10—13). The punishment of running aloe thorns into an offender's body appears to have been also inflicted upon criminals of more advanced age ('Mendoza Codex,' plate lxiii., figs 9—14).

* Kingsborough, *l.c.*, vol. i., 'Mendoza Codex,' plate lxi., figs. 22—28, vol. vi., p. 62.

† Ibid., plate lxi., figs. 33—36, vol. vi., p. 62.

‡ See page 94.

§ Turquoise is an aluminium phosphate containing about 20 per cent. of water. Its blue colour is due to a small but varying per-centage of copper phosphate.

the art would seem to have been long practised under the fostering of wealth and power, although so few examples of it have come down to our time.*

We learn from the tribute-roll in the "Mendoza Codex," that one district contributed ten masks incrusted with turquoise-mosaic every year,† as well as a large bag of the unset stones,‡ whilst other districts sent, as part of the annual tribute to the Mexican monarch, a little vessel full of turquoise stones,§ strings of turquoise stones squared as if for inlaying,‖ or circular tablets inlaid with turquoise-mosaic.¶

All the known specimens of Aztec mosaic are of one class of work; the predominant feature being the use of turquoise.

One of these specimens is a stone knife, in its original handle; the blade is of chalcedony, fixed in a wooden handle having the form of a crouching human figure, with the head appearing through an eagle-head mask.** The entire handle is incrusted with mosaic of malachite, turquoise, bone, and red and white shell. It measures twelve inches and a half in length. This specimen brings before us the curious fact of a people who had attained to some considerable advance in art still remaining in the Stone age, or at all events still using stone for ceremonial or sacrificial purposes. Somewhat curiously, the locality of the stone blade is fixed, by its being of that semi-transparent opalescent chalcedony which Humboldt describes as occurring in the volcanic districts of Mexico—the concretionary silex of the trachytic lavas.††

Another of these rare objects is a mask of wood covered with minute pieces of turquoise—cut and polished, accurately fitted, many thousands in number, and set in a dark gum or cement. The eyes are acute-oval patches of mother-of-pearl; and there are two small square pieces of the same material on the temples, through which a string passed to suspend the mask;

* 'Anahuac,' p. 337.

† Kingsborough, *l.c.*, vol. i., plate xlii., fig. 33, vol. vi., p. 33.

‡ Ibid., vol. i., plate xlii., fig. 34., vol. vi., p. 33.

§ Ibid., vol. i., plate iv., fig. 28, vol. vi., pp. 41, 42.

‖ Ibid., vol. i., plate xliii., fig. 17, vol. vi. p, 32..

¶ Ibid., vol. i., plate liv., figs. 29, 30, vol. vi., p. 42.

** Persons wearing eagle-head masks are represented in the picture-writings, Kingsborough, *l.c.*, vol. ii., 'Vienna Codex,' plates xxxv., xxxvi.—Ibid., vol. iii. 'Borgian Codex,' plates xvi., lvi., lvii.

†† 'Anahuac,' pp. 101, 110, 338.

the teeth are of hard white shell. The eyes are perforated; so are the nostrils; and the upper and lower teeth are separated by a transverse chink; thus a wearer of the mask (which sits easily on one's face) can see, breathe, and speak with ease. The features bear that remarkably placid and contemplative expression which distinguishes so many of the Aztec works, in common with those of the Egyptians, whether in their massive stone sculptures or in the smallest and commonest heads of baked clay. The face, which is well proportioned, pleasing, and of great symmetry, is studded with numerous projecting pieces of turquoise, rounded and polished.

In addition to the character of the work and the style of face, the evidence of the Aztec origin of this mask is confirmed by the wood being of the fragrant cedar or cypress of Mexico. It may be remarked also that the inside is painted red, like the wooden masks of the Indians of the north-west coast of America at the present day.*

A second mask, in the Christy Collection, is yet more distinctive. The incrustation of turquoise-mosaic is placed upon the forehead, face, and jaws of a human skull,† the back part of which has been cut away to allow of its being hung, by the leather thongs which still remain, over the face of an idol, for it was a custom in Mexico thus to mask their gods on state occasions. The mosaic of turquoise is interrupted by three broad transverse bands, on the forehead, face, and chin, of a mosaic of obsidian, similarly cut (but in larger pieces) and

* 'Anahuac,' p. 338.

† Many persons wearing skull-masks are represented in the picture-writings. See Kingsborough, *l.c.*, vol. ii., 'Mex. MS.,' (Laud, 546) plates xxiii., xxvii. Some of the skull-masks have a very long and pointed nose attached to them, plates vii., xx., xxiv., xxxix.—xlii., xliv.—xlvi.

Ibid., vol. ii., 'Bologna Codex,' plate xviii.

Ibid., vol. ii., 'Vienna Codex,' plates xiv., xlix.

Ibid., vol. iii., 'Borgian Codex,' plates v., viii,, xvi., xvii., xxiii., xxiv., xxvi., xxxvii., xxxix., xl., xlv., lviii., lix., lxii., lxiii., lxv., lxvi., lxix., lxxi., lxxii., lxxiv., lxxv. In plate lvii., a man wearing a skull-mask is represented in the act of swallowing a human victim.

Ibid., vol. iii., 'Dresden Codex,' plates ix., x., xv., xvii., xix., xxii., xxiii., xlv., xlvii., liii.

Ibid., vol iii., Mex. MS. (Fejérváry) plates (all with the long and pointed nose) viii., xi., xxii., xxvii., xlii.

Ibid., vol. iii, 'Vatican Codex,' plates vii., xxii., xlix, liii., lv, lx., lxxxix., xc., (and with the long pointed nose) lxviii. and lxix.

highly polished—a very unusual treatment of this intractable material.*

The eye-balls are nodules of iron-pyrites,† cut hemispherically and highly polished, and are surrounded by circles of hard white shell, similar to that forming the teeth of the wooden mask. The Aztecs made their mirrors of iron-pyrites polished, as already mentioned,‡ and they are the only people who, whilst in their Stone or Bronze Age, are known to have put this material to ornamental use.§ The mouth of the skull-mask is made to open, and the inside is lined with leather. The mixture of art, civilisation, and barbarism presented by the hideous aspect of this green and black skull-mask, accords with the condition of Mexico at the time of the Conquest, under which human sacrifices on a gigantic scale were coincident with much refinement in arts and manners.‖

The European history of these three specimens is somewhat curious. With the exception of two in the Museum at Copenhagen, obtained many years ago by Professor Thomsen from a convent in Rome, and, though greatly dilapidated, presenting some traces of the same kind of ornamentation, they were until recently believed to be unique.

The wooden mask and the knife were long known in a Collection in Florence. About the year 1830, the mask was brought into England from that city, as Egyptian; and somewhat later, the knife was obtained from Venice.

Subsequently the skull-mask, with a wig of hair said to be a scalp, was found at Bruges—a locality which leads to the presumption that the mask was brought from Mexico soon after the Conquest in 1521, and prior to the expulsion of the Spaniards from Flanders consequent on the revolt of the Low Countries in 1579.

It happens singularly enough, that a curious old work,¶ con-

* Persons wearing masks having similar broad transverse black bands are represented in the picture-writings. See Kingsborough, *l.c.*, vol. iii., 'Borgian Codex,' plates xviii., xx., xxv., xlvi. Ibid., vol. iii., 'Vatican Codex,' plates vi., lxvii.

† Iron pyrites is a compound of sulphur and iron. There are two forms of it, the same in composition, but differing in crystallization, specific gravity, &c.

‡ See page 307.

§ One of the forms of iron pyrites, called *marcasite*, was much employed in jewellery, in France and England, in the eighteenth century.

‖ 'Anahuac,' p. 338.

¶ Aldrovandus, 'Musæum Metallicum,' Bologna, 1648.

tains drawings of a knife and wooden mask ornamented with mosaic-work of stone, made just in the same way as those in the Christy Collection, and only differing from them in design. It is not known whether the originals are still in existence.*

This highly interesting series has been increased by Mr. Franks since the death of Mr. Christy, and the entire group now occupy a central Case in Room IV., at the Christy Museum—the room fitted up as a Museum by Mr. Christy, and in which the founder of this valuable Collection was wont to explain the treasures he had brought together with so much enthusiasm, and with a kindness and courtesy peculiarly his own.

One of the recently acquired Aztec mosaics is the representation of a Mexican calendar, made of wood and incrusted with turquoise, and red and white shell. In the centre is the solar disc with the emblems of the months resting on a tree, about which is entwined a serpent; on each side are figures, possibly of the seasons. The central figure was originally margined with gold studs.† Another specimen represents an animal's head carved in wood, and incrusted with mosaic of turquoise, malachite, pearls, and garnets. The eyeballs are of polished iron-pyrites. It was presented to the Christy Collection by Mr. Franks. The use of pearls in this mosaic is interesting, for, although Montezuma is described as wearing pearls,‡ no mention is made in the tribute-roll, in the "Mendoza Codex," of either silver, pearls, emeralds, or rubies, all of which are enumerated by Spanish historians in the list of the first presents sent by Montezuma to Cortes.§

Masks.

Mention has already been made of the masks which were used by the Mexicans, and it appears from passages in the works of the earlier Mexican writers, that it was customary to mask the idols on the occasion of the King being sick, or of any public calamity; and that men and women wore masks in some of the religious ceremonies. Persons wearing masks are frequently

* 'Anahuac,' pp. 338, 339.

† A. W. Franks, 'Guide to the Christy Collection,' 1868, p. 20.

‡ Prescott, 'Conquest of Mexico,' vol. ii., p. 63.

§ Kingsborough, *l.c.*, vol. vi., p. 43, *note.*

represented in the picture-writings,* some of which show that there was a hinge enabling the lower jaw of the mask to be raised or lowered at the pleasure of the wearer.† Figures, perhaps intended for idols, are represented wearing skull masks,‡ and there is a drawing of a mask bound to an upright bundle of canes.§

Examples of ancient masks in stone, wood, and terra-cotta are to be seen in considerable numbers in collections of Mexican antiquities. There is a fine mask of brown lava in the Christy Museum; it measures twelve inches in height and is ten inches in width.‖ The features are in repose, the eyes are closed, the mouth widely distended, large circular ornaments are in the ears.¶ The *inside* of the mask bears the representation of a seated human figure, in low relief. The head-dress consists partly of large tassels, and the perforated ear-laps are ornamented with large stoppers or pegs, in the same way as those in the ear-laps of the mask. This ornament seems to

* Kingsborough, *l.c.*, vol. ii., 'Mex. MS. (Laud, 546)' plate ii.

Ibid., vol. ii., 'Bologna Codex,' plates ix.—xi.

Ibid., vol. ii, 'Vienna Codex,' plates i.—iii., x., xviii., xx., xxiii.—xxviii., xxxi.—xxxiv., xlvii., xlviii.

Ibid., vol. iii., 'Borgian Codex,' plates ii., vii., ix., xiv., x., xx., xxi., xxiii.—xxv., xxviii., li., lxi., lxiv., lxvii., lxviii.

Ibid., vol. iii., 'Dresden Codex,' plates xxv.—xxviii.

Ibid., vol. iii., 'Mex. MS. (Fejérváry),' plates ii.—vii., x., xiv., xxi.

Ibid., vol. iii., 'Vatican Codex,' plates xxii., xxv., xxviii., lvii., lxx., lxxii., lxxix., lxxx., lxxxiv.

† Ibid., *l.c.*, vol. ii., 'Mex. MS. (Laud, 546),' plates xxix., xxxviii., xliii.

Ibid., vol. iii., 'Borgian Codex,' plates xxiv., xxxi.—xxxiv., xlix., liv.—lvi., lviii., lxiii.

Ibid., vol. iii., 'Mex. MS. (Fejérváry),' plate xx.

Ibid., vol. iii., 'Vatican Codex,' plates xlix., l., liii.

‡ Ibid., *l.c.*, vol. iii., 'Mex. MS. (Fejérváry),' plates xi., xiii., xiv., xxii.

§ Ibid., *l.c.*, vol. ii., 'Vienna Codex,' plate xxvi.

‖ 'Anahuac,' pp. 225, 226.

¶ Large oval or circular blocks are worn in the ears by tribes such as the Nayas, on the north-west coast of America; by tribes on both sides of the Amazon, above the mouth of the Rio Negro, in South America, such as the Muras, Iquitos, Omaguas, Ticunas, Yahuas, Marahuas, Orejones, Mayorunas, Connibos, and Sepibos; and by the Payaguas, Botocudos, Lenguas, and Tobos, still more to the south. These ear-blocks are about half an inch in thickness, and from two inches to two inches and three quarters in diameter. The cartilage and lobes of the ear are slit for the purpose of receiving them. Similar blocks are sometimes worn by the men in the under lip, but this mode of disfigurement is chiefly adopted by the women.

have been a very common one with the ancient Mexicans, for it occurs as a decoration in the ears of many of the terra-cotta idols and heads in collections. The figure grasps a spear, or a sceptre in the left hand, the right hand is placed upon the breast. This mask has been figured in two aspects,* showing both the inside and the outside. There are some very small masks from Palenque, in the Christy Collection, and M. Steinhaur has expressed the opinion that they were used to mask the small household gods.† Masks, however, have been applied to other purposes than as coverings for the face of men or idols. Thus the ancients suspended masks of Bacchus (*oscilla*) in the vineyards, attached to branches of trees in such a manner that the wind swung them freely in every direction, and whichsoever way they turned their stony features they were supposed to render the vines in that quarter fruitful.‡ An *oscillum* of white marble is preserved in the British Museum; this mask is concave at the back, and has the mouth and the pupils of the eyes perforated. The metallic ring by which it was suspended still remains. An ancient gem has been figured,§ the subject upon which consists of a tree with four *oscilla*‖ hanging from its branches.

Lord Kingsborough has figured several masks; one of these, made of green jasper, with the mouth and nose perforated, was found in making an excavation on the side of the great pyramid at Cholula.¶ Another, made of green agate, finely polished, and with holes for suspension, was found in Tlascala.** A third is figured from a specimen in the collection of M. Latour Allard, of Paris.†† The most uncommon example figured by Lord Kingsborough is a mask, made of a white transparent and gritty stone (tecalle); it was found in a cave near Chonacatepec; the back of this mask is *flat*, unlike the generality, which are concave, so as to fit the face.‡‡

* 'Anahuac,' p. 226.

† 'Catalogue of the Christy Collection,' 1862, p. 34.

‡ Virgil, 'Georg.' ii., 388—392.

§ Maffei, 'Gem. Ant.' iii., 64.

‖ The verb *oscillo*, 'to swing,' is derived from the noun *oscillum*, and has its origin in the motion of these masks when agitated by the wind. See Smith, 'Dic. Greek and Rom. Ant.' p. 846.

¶ Vol. iv., part 1, fig. 19, vol. vi., p. 427.

** Vol. iv., part 2., fig. 124, vol. vi., p. 464.

†† Vol. iv., fig. 3.

‡‡ Vol. iv., part 2, fig. 52, vol. vi., p. 442.

In the Museum at Mexico there is a mask made of obsidian, which is an extraordinary piece of work considering the difficulty of cutting such a material. It appears to have been roughly chipped into form and then finished by sand polishing. The polish is perfect, there is hardly a scratch upon it. Another obsidian mask, in the Collection of Count Peñasco, has been figured.* It is as smooth as if cast of glass, and then highly polished. Mirrors of obsidian are not particularly rare, there is one preserved in the British Museum, another was shown in the Paris Exhibition (1867).

Rings made of obsidian occur among Mexican antiquities—a specimen in Count Peñasco's Collection has been figured.† It is six-tenths of an inch high, one-tenth of an inch thick, and nineteen-twentieths of an inch in diameter. The graceful curves of the exterior and interior surfaces, and the high polish, are perfectly preserved. Obsidian was used for artistic and ornamental purposes in the Old World. Pliny says:—"Many persons use it (obsidian) for jewellery, and I myself have seen solid statues in this material of the late Emperor Augustus, of very considerable thickness." Intagli of obsidian are very rare.‡

Masks, each carved out of a solid block of wood, are made and used by the Esquimaux, the North American Indians, and many other savages. No. 12, Case H 14, is an Esquimaux mask of this kind. No. 7, Case H 10, is a wooden mask from Upper Canada; the two other wooden masks in the same Case, Nos. 8 and 9, are Eastern, probably Burmese. In America, very grotesque masks are made by tribes living on the north-west coast; see Nos. 2 and 3, Case H 9. No. 1, in this Case, is a wooden helmet used by the Koloshians, who inhabit from lat. 54 deg. 40 min. to Cook's Inlet. It is not unlike some of the Mexican helmets figured in the picture-writings. The American masks are worn by the "medicine men" when practising their art, and by both men and women in some of their dances; they are usually ornamented with strange designs in vivid colouring, and some of them have a contrivance by means of which the eyeballs can be made to move. A large series may be seen in the Christy Collection.

Masks were worn by Greek and Roman actors; the custom

* Schoolcraft, *l.c*, vol. vi., p. 587. Other obsidian masks are figured at page 588.

† Schoolcraft, *l.c.*, vol. vi., p. 588.

‡ Hodder M. Westropp, 'The Traveller's Art Companion,' p. 325.

is thought to have arisen from the practice of smearing the face with colours, and of appearing in disguise, at the festivals of Dionysus.* When actors at Rome displeased their audience and were hissed, they were obliged to take off their masks. A grotesque mask of a satyr, and a very fine specimen of a tragic mask are preserved in the British Museum (Townley Gallery.)†

* Some ancient masks only covered the face, but they appear more generally to have covered the whole head down to the shoulders, for the hair is usually described as being part of it; and this must have been the case in tragedy more especially, as it was necessary to make the head correspond to the stature of an actor, which was heightened by the *cothurnus*. The *cothurnus* was a boot with a very thick sole; it was not only worn by the actors in Athenian tragedy in order to increase their apparent height, but it was also adopted by ladies who were not so tall as they wished to appear (Juv. *Sat.* vi., 507); in fact it was intended to answer the same purpose as the present boots with high heels. It may at first seem strange to us, that the ancients, with their refined taste in the perception of the beautiful in form and expression, should, by the use of masks, have deprived the spectators in their theatres of the possibility of observing the various expressions of which the human face is capable, and which with us contribute so much to theatrical illusion. But it must be remembered that in the large theatres of the ancients it would have been impossible for the greater part of the audience to distinguish the natural features of the actor. The features of the masks were for this reason very strong and marked. Again, the dramatis personæ of most of the ancient tragedies were heroes or gods, and their characters were so well known to the spectators, that they were perfectly typical. Everyone, therefore, knew immediately on the appearance of such a character on the stage, who it was, and it would have been difficult for a Greek audience to imagine that a god or hero should have had a face like that of an ordinary actor. The use of the *cothurnus*, as already mentioned, rendered a proportionate enlargement ot the countenance absolutely necessary, or else the figure of an actor would have been ridiculously disproportionate. Lastly, the solemn character of ancient tragedy did not admit of such a variety of expressions of the countenance as modern tragedies. It is, as Müller (*History of the Literature of Ancient Greece*, 1, p. 298,) justly remarks, perfectly possible to imagine the Ajax of Sophocles, or the Medea of Euripides, throughout the whole tragedy with the same countenance, though it would be difficult to assert the same of a character in any modern drama. Whether the open or half-open mouth of a tragic mask also contributed to raise the voice of the actor, as Gellius (v. 7) thinks, cannot perhaps be decided, though we know that all circumstances united to compel a tragic actor to acquire a loud and sonorous voice.—Smith's 'Dic. Greek and Roman Antiquities,' pp. 889-893, *Persona.*

That some of the Aztec masks were typical is highly probable; such as these would have been worn by the priests and others when they personated this or that particular god.

† Smith, 'Dic. Greek and Rom. Ant,' pp. 889–893. Article, *Persona.*

Bronze.

Mr. Edward B. Tylor has remarked that, "among the most valuable classifications of the culture of mankind is that of the Stone, Bronze, and Iron Ages." He adds that, "on a very rough and general comparison, these may be taken as belonging, —stone to savagery, bronze to barbarism or low civilisation, and iron to the middle level of civilisation and onwards. . . The typical bronze-using races of modern history are the Mexicans and Peruvians, and what is known of them fits well with our dim information of the Bronze Age in ancient Europe and Asia, so as to justify the opinion that bronze always indicates a state above savagery, though at most extending to the middle range of civilisation."*

We learn from the picture-writings that one district in Mexico sent as part of the annual tribute 100 wedge-shaped copper (bronze?) hatchets.† Another district sent among other things 40 bronze bells‡ and 80 wedge-shaped bronze hatchets.§

Bronze hatchets appear to have been in general use by the Mexicans. Bernal Diaz mentions that he and his companions noticed the Indians of the coast carrying bright metal axes, the material of which looked like gold of low quality. A barter for glass-beads was established forthwith, and the Spaniards obtained, in three days, six hundred of the axes before they discovered that the imaginary gold was nothing but copper. The words of Bernal Diaz are quaint enough:—"While under the mistake we were as well pleased with our bargain as the Indians with their green beads. One mariner thought he had made his fortune, having purchased seven of them." On the return to Cuba, he adds, "the governor was well pleased with the gold, which amounted in value to twenty thousand crowns; but there was much laughter when the six hundred hatchets were produced and assayed."‖

Copper axes have been found at Mitla, in the State of Oaxaca,

* 'The Condition of Prehistoric Races, as inferred from Observation of Modern Tribes,' in 'Trans. Int. Con. Prehis. Archæol.,' 1868, pp. 12, 13.

† Kingsborough, *l.c.*, vol. i., 'Mendoza Codex,' plate xxxix., fig. 2c., vol. vi., pp. 29, 30.

‡ Ibid., vol. i., plate xlii., fig. 19., vol. vi., p. 32.

§ Ibid., vol. i., plate xlii., fig. 20., vol. vi., p. 32.

‖ 'The True History of the Conquest of Mexico,' 1568, translated by Maurice Keatinge. 1800. Pp. 22, 23.

where the ruined temples seem to form a connecting link between the monuments of Teotihuacan and Xochicalco, and the ruined cities of Yucatan and Chiapas. The same kind of tools appear to have been in use in Yucatan, for in the Dresden Codex* there are drawings of hatchets similar to those of Mexico, and attached to the same kind of handles; they are, however, of neater workmanship. The "Dresden Codex" is not of Aztec origin; its hieroglyphics are those of Palenque and Uxmal.†

No less than 276 bronze hatchets, of a wedge-shaped form, with a semi-lunar cutting edge, much elongated at each end of the edge, were found by an Indian, while ploughing his field, at Zocho, a town near Oaxaca. They were contained in two large earthen vessels; a typical specimen has been figured.‡ Several chisels, probably of unalloyed copper, have also been found near Zocho; they exactly resemble in form and *thickness* the ordinary stone chisels. One of these copper chisels has been figured.§ A wedge-shaped copper (bronze?) hatchet, found near the village of Quilapan has been figured.‖

The use of bronze by the Mexicans, appears to have been almost limited to the manufacture of hatchets and chisels; at all events many contemporary cutting implements and weapons, such as swords, knives, and daggers, continued to be armed with obsidian, and that these stone-edged weapons were also contemporary with the objects incrusted with turquoise-mosaic seems to be proved by the occurrence of obsidian-edged swords¶ and turquoise masks** in the same tribute-roll.

It would be interesting to learn whether the Mexican bronze contained the usual old-world proportion of tin, namely, about 10 per cent. Dr. Wilson has published the analyses of some ancient American bronze objects, and these were found to contain no more in any instance, than 7·615 per cent. tin; indeed one bronze knife showed so small a per-centage of tin as 2·13.††

Gold formed part of the regular tribute of the southern

* Kingsborough, *l.c.*, vol. iii.

† 'Anahuac,' pp. 138, 139.

‡ Kingsborough, *l.c.*, vol. iv, part 2, fig. 75, vol. vi., p. 446.

§ Ibid., *l.c.*, vol. iv., part 2, fig. 77, vol. vi., p. 446.

‖ Ibid., *l.c.*, vol. iv, part 3, fig. 4, vol. vi., p. 468.

¶ Ibid., *l.c.*, vol. i., 'Mendoza Codex,' plate xliv., fig. 26, vol. vi., p. 34.

** Ibid., vol. i., 'Mendoza Codex,' plate xlii., fig. 33.

†† 'Prehistoric Man,' vol. i., p. 312.

provinces of the Mexican empire. It was paid in dust,* in plates of the size of an oyster,† of a middle-sized salver,‡ or of the breadth of four fingers and three quarters of a yard in length.§ Diadems‖ and head-bands of gold,¶ of the breadth of the hand and about as thick as parchment, were also exacted.**

Bernal Diaz mentions that the Indians of the coast used head-bands of gold. "I recollect also that a soldier, named Bartolomeo Pardo, entered a temple which was on the summit of a high mount, and there found in a chest some diadems and collars of gold, and two figures of idols. The gold he kept for himself, and presented the idols to our commandant. The story, however, came to the ears of the latter, who insisted on having the gold, but was induced to leave it with the poor man on his paying his Majesty's fifth, and the whole was not worth eighty crowns."††

New Mexico.

A 42.

No. 10 (S and D 473). A stone ball from Casa Blanca.

No. 11 (S and D 570). Fragment of a stone amulet.

No. 12 (S and D 569). Small stone amulet in the form of a bear; such amulets are still worn by the Pimo Indians.

No. 13 (S and D 19). Bone awl made from the fibula of a deer; it was found in the river Gila.

* Kingsborough, *l.c.*, vol. i., 'Mendoza Codex,' plate xli., fig. 21, plate xlv., fig. 27, plate xlvii., fig. 4.

† Ibid., plate xlii., figs. 31, 32.

‡ Ibid., plate xlvi., fig. 17.

§ Ibid., plate xli., fig. 20.

‖ Ibid., plate xlviii., fig. 30, vol. vi., p. 37.

¶ Ibid., plate xlviii., fig. 31.

** When Cortes demanded gold, Montezuma, "sent officers to those districts in which the mines were situated, requiring a quantity of plates of gold, of the usual size paid in tribute, two of these being sent as a standard. . . . . In twenty days from the time of the orders being issued the tribute was collected. . . . . The articles of gold were placed in three heaps, weighing upwards of six hundred thousand crowns, the gold being in plates and bars, and in the rough state as it came from the mines."—Bernal Diaz, *l.c.*, pp. 170, 171.

†† 'The True History of the Conquest of Mexico,' pp. 22, 23.

Cases E 7 & H 20.

Pottery from Mexico.*

E 7.

No. 1 (S and D 23). Vessel of brown ware, in the form of a puma, ornamented with incised lines; beneath the throat is a cavity in which there is a loose clay ball to serve as a rattle.

This specimen was excavated from the ruins of Palenque, in 1760, it was presented to Dr. Davis by Dr. J. B. Perez, in whose family it had been preserved from the time it was found.

Terra-cotta rattles are abundant among Mexican antiquities. Mr. Tylor says "they have little balls in them which shake about, and they puzzled us as much as the apple-dumpling did good King George, for we could not make out very easily how the balls got inside. They were probably attached very slightly to the inside, and so baked and then detached." †

At the time of the conquest of America, Palenque was the principal city of a considerable province of the Aztec kingdom; it is situated in the north-western part of the present State of Chiapas. Although the inhabitants of Palenque may be regarded as a southern branch of the old Mexican population, and, although the same idols and the same superstitions seem, as far as we are able to judge from the remains left us in the ruins of the town, to have prevailed amongst them, there are still some peculiarities, both in the material and in the whole style of the idols, &c., which strongly oblige us to keep them distinct, as a separate branch of the same civilisation and superstitious culture. ‡

No. 2.—Fragment of a terra-cotta figure representing a seated human figure.

No. 3.—Terra-cotta representing a human head.

Upon Tablet 4 *a* is a terra-cotta bead.

Upon Tablet 4 *b* (S and D 69), is a fragment of terra-cotta, representing a human head.

Upon Tablets 14 *a* to *c* are other terra-cotta figures of human heads from Teotihuacan; these, as well as the specimen upon Tablet 4 *b*, apparently represent heads artificially flattened.

* See pp. 241—257.

† 'Anahuac,' p. 226.

‡ Steinhauer, 'Catalogue of the Christy Coll.,' p. 36.

In the vicinity of some of the ancient teocallis, and on other sacred sites, small terra-cottas, chiefly representing the heads of men and animals, abound. In the Collection of the American Philosophical Society, Philadelphia, there are nearly a thousand of these objects, some of which illustrate the artificial malformations of the human head, others show the prevailing national features, the modes of dressing the hair, the great variety of head-dress and of ornaments which were worn in the hair. In the same Collection are twenty-eight clay masks of the human face,* varying in dimensions, from about half life-size to somewhat larger than life. They are executed with great freedom and considerable artistic skill; some of these have the features exaggerated into caricature with much spirit, others appear to be portraits of individuals with features quite unlike those of the Red Indian.†

Upon Tablet 5 *a* is a fragment of ware.

Upon Tablet 5 *b* and *c* are terra-cotta spindle-whorls.‡

Upon Tablet 16 *a* to *k*, are other terra-cotta spindle-whorls.

Several ancient stone and terra-cotta spindle-whorls (malacates)§ are preserved in the Christy Collection. A modern spindle-whorl on the spindle is shown with the ancient examples; it was bought, at Amatlan, in 1856, where it was in use.

Upon Tablet 5 *d* and *e* are terra-cottas representing seated human figures.

No. 6 is part of a flute in terra-cotta.

No. 7. is a terra-cotta whistle, in the form of a monster.

No. 8.—Figure of an animal made of the scented clay of Mexico, brought from Teotihuacan. This specimen and No. 9 are probably modern; they were formerly in the United Service Museum.

No. 9.—Cup made of the scented clay of Mexico.

No. 10 (S and D 65).—Cast of an idol found at Cholula; the original is in the Collection of Dr. Barlow.

No. 11 and No. 3 H 20.—Terra-cotta basins standing on three legs.

No. 12 (S and D 64).—Fragment of black ware representing

* See pp. 328—331.

† Wilson, 'Prehistoric Man,' vol. ii., pp. 100, 101.

‡ See page 94.

§ *Aztec*, "malacatl," a spindle, spindle-whorl, windlass, &c. 'Anahuac,' p. 336.

a woman's head, found in Chacultepec. The figure has an elaborate head-dress and ornaments in the ears.

Upon Tablet 13 are two feet of a vase, in the form of animals' heads.

Upon Tablet 15 *a* and *b* are portions of terra-cotta figures.

Upon Tablet 16 *l* is a jade bead, presented to the Collection by the Trustees of the Christy Musuem.

H 20.

No. 4.—Double bottle in red ware (modern), presented by Mr. W. D. Wilkes.

The series of Mexican pottery is very small. Visitors interested in Mexican antiquities should see the extensive collection in the Christy Museum, which includes several terra-cotta figures of Mexican deities, exhibiting many distinct styles of art, and being probably relics of different races by whom the country has been successively occupied.* In the Museum at Mexico, in the British Museum, and in the Christy Collection there are some terra-cotta stamps with geometrical patterns, for making lines and ornaments on the vases before they were baked, and for stamping patterns upon cotton cloth.† Some of these stamps in the Christy Collection were obtained at Cholula, as well as a mould for making little jackal-heads in clay for baking.‡

The terraced *teocalli* of Cholula is perhaps the oldest ruin in Mexico; it is built of sun-dried bricks, cemented together with mortar, and is about 200 feet high, the base-line being more than thirteen hundred feet. The mortar used in the construction of the *teocalli* is full of broken obsidian flakes and implements; fragments of *uncoloured* ware also occur in it, but no pieces of coloured pottery; although bits of coloured ware are abundant enough in the neighbourhood of the pyramid. Cholula was celebrated for its manufacture of pottery, and, at the time of the Conquest, it was famous for its red-and-black ware.§ Unfortunately the manufacture of sham antiquities is as common in Mexico as it is in England. One shelf in the Museum at Mexico is filled with these forgeries, and, probably,

* Franks, 'Guide to the Christy Collection,' p. 19.

† Ibid., p. 229.

‡ Ibid., p. 275

§ 'Anahuac,' pp. 274, 275.

very few collectors of Mexican objects have been so fortunate as to be able to look back without a pang upon *all* the purchases they have made.

Cases E 7 and H 20.

Pottery from New Mexico.

E 7.

Upon Tablets 17 *a* to *c*, 18 *a* to *f*, and 19 *a* to *f* (S and D 19), are fragments of ware ornamented with red, black, and white paint, from the ruins of Casa Blanca, on the river Gila. Fragments of pottery closely resembling these specimens have been figured.* They were obtained by Lieutenant-Colonel Emory, U.S.A., during the march of the army down the valley of the Gila at the time of the Mexican war, 1846-47.

H 20.

No. 1 (S and D 18).—Large vase, ornamented with black and white paint. Brought across the plains by Governor Lane.

No. 5 (S and D 16) and No. 6 (S and D 17).—Shallow bowls of black ware, such as are still made and used by the Indians of the present day.

The Central District of North America.†

It has been already mentioned‡ that Sir John Lubbock considers there are indications of the existence of four long periods, or phases of civilisation, in the central district of North America.

1. That in which, from an original barbarism, the American tribes developed a knowledge of agriculture and a power of combination.
2. That in which, for the first time, mounds were erected and other great works undertaken.

* Schoolcraft, 'Archives of Aboriginal Knowledge,' vol. iii., plate xx., pp. 83—85.

† Page 219.

‡ Page 220.

3. The age of the "garden-beds," which occupy some, at least, of the mounds. Hence it is probable that these particular "garden-beds" were not in use until after the mounds had lost their sacred character in the eyes of the occupants of the soil, for it can hardly be supposed that works executed with so much care would be desecrated by their builders.
4. The period in which man relapsed into partial barbarism, and the spots which had been first forest, then, perhaps, sacred monuments, and, thirdly, cultivated ground, relapsed into forest once more.

Sir John Lubbock is of opinion that all these changes may have taken place within the last three thousand years.*

Probably very few vestiges of the first period have reached our time, but the Blackmore Collection is particularly rich in remains of the second period.

Tumuli of the Central District of North America.

From Florida to Canada, and from the Atlantic to the Pacific Ocean, the American soil is strewn with tumuli, entrenched camps, and other earthworks. These monuments are particularly numerous in the valleys of the Mississippi and the Ohio. Tumuli, however, exist in Oregon, on the banks of the Gila, of the Colorado, and their tributaries. The plan and construction of these monuments differ according to the place where they were erected, and they are, probably, the work of various peoples. In the vicinity of the Great Lakes, and in the States of Wisconsin, Iowa, Michigan, and Missouri, the tumuli are sometimes of conical form, but they are frequently in the shape of quadrupeds, birds, reptiles, and even of man.

The following notice of the tumuli of America has been kindly contributed by Mr. John D. Sherwood.

* 'Prehistoric Times,' p. 234.

TUMULI OF AMERICA.

The tumuli scattered through the middle and eastern parts of the United States constitute the most striking antiquities of that country. They were objects of strange curiosity and wonder even to the stolid Indian tribes existing at the time of the earliest explorations of Europeans, during the sixteenth century.

Imposing architectural remains and ruins still exist in various parts of America. Among these may be mentioned the Cyclopean monuments near Lake Titicaca, in Bolivia; the truncated pyramids of the ancient Mexicans; the imposing structures of Mitla; the pyramidal temples of Teotihuacan; the sculptured monoliths at Palenque, Copan, and elsewhere in Guatemala, Peru, and New Granada; the extensive ruins of temples and other edifices found in Yucatan, and throughout Central America.

Architectural remains such as these, however, do not occur northward of the southern boundary of the North American Republic. Over this extensive region the archæologist will have to seek for traces of the habits and customs of the prehistoric races who inhabited this part of the continent of America, in the artificially formed tumuli or other earthworks reared by their hands.

To these earthworks the attention of scientific men has of late been carefully and closely directed.

From the many tents now pitched over this broad field of inquiry, we may reasonably anticipate that much light will be thrown upon the origin, race, epoch, character, and civilisation of the mound-builders. At present, however, it must be admitted that the rays which glint across the dark vista stretching away into the pre-historic past are feeble enough. Who were the constructors of these vast tumuli, beneath which, we may believe, rest the remains of the good, the brave, the powerful of this forgotten people?

Many and various conjectures have been hazarded upon this point. Different authors have their favourite theories, and it has been maintained in succession that the mound-builders were of Celtic, of Hebrew, or of Tartar origin; that they migrated from the frozen regions of the north, or that they swarmed out from the traditional mother hives of Asia, and took their way across Behring's Straits, ultimately spreading over the greater part of the present territory of the United States.

The traditions of the aborigines found living near these tumuli on the first visit of Europeans afford us no assistance with regard to the solution of these questions.

Probably the only satisfactory answer to be obtained must be wrung from the mounds themselves, their position relatively to surrounding objects, the craniological character of the skulls found in them, and the implements and objects almost invariably associated with these remains. When collated with like remains found elsewhere we may hope to obtain results of a reliable nature as to the origin, race, and era of the mound-builders, and of the comparative advances made by them in civilisation.

Tumuli and earthworks occur in the districts near the northern lakes of the United States; are liberally sprinkled through the States of Ohio and Illinois; extend eastward of the Alleghany slopes through Pennsylvania and New York, and are to be met with in a few of the Eastern States; they stud thickly the valley of the Mississippi, and are found in the Isthmus which connects North and South America.

In addition to the mounds and enclosures which are believed to have been devoted to sacred or sepulchral uses, there are some earthworks which seem to have been intended for military posts or defences. Often the protecting lines or circumvallations of these are several miles in extent, and enclose many hundred acres. In these earth-works, the existence of angles, salient, re-entering, and so on, indicate the possession of considerable knowledge of the general principles of fortification. Springs, or reservoirs of water, artificially sunk inside the enclosing lines are often met with; but more frequently these earthworks are placed near some river, so that the requisite supply of water could be readily obtained, without the risk of separating the watering party from the protection of the main body in the camp.

Some of the American earthworks are in the forms of serpents, animals, or symbolic figures, and may have had some relation to a religious symbolism, or worship. These animal-

figures are embossed as it were upon the surface of the ground; they resemble vast *alti rilievi*—raised characters of doubtful meaning, written by a long-since-forgotten race upon the virgin tablet of the vast prairies of America.

The earthworks supposed to be of a religious character differ from those intended for military use in having their surrounding ditch *within* the earthern rampart instead of *without* it, as is the case with the forts. The "sacred" enclosures include within their banks many tumuli. In some of these human skeletons are found, but interments by cremation appear to be more frequent than those by simple inhumation. The perishing condition of the skeletons serves to attest their high antiquity. Relics of art, implements, and personal ornaments, elaborately and skilfully carved out of hard varieties of stone, are found in these mounds. These objects afford evidence of the possession of taste, far superior to that of the modern Indians, and far different in kind, and elevation of thought and sentiment, from anything we now find existing among the aborigines. The pottery is often of elegant design, and, although not turned on the lathe, is frequently elaborately ornamented.

The collection of objects obtained from the mounds of Ohio by Professor E. H. Davis, during a long residence in the district, is probably the most complete and illustrative which has been brought together. This fine collection now enriches the Blackmore Museum, and the visitor will be surprised to find in this series objects displaying so much skill and refinement of feeling, carved from highly intractable materials into the figures of reptiles, birds, and mammalia, at once true to nature in form, attitude, and expression.

The American must visit this Collection in order to inspect the largest, rarest, and most varied series of evidences of the taste and skill of the mound-builders.

JOHN D. SHERWOOD.

New York, October 23, 1869.

The animal-mounds mentioned by Mr. Sherwood are most singular earthworks.

Animal-Mounds.

These "Animal-Mounds" were first noticed by Mr. Lapham in 1836, and were described in the newspapers of the day; but the first account given of them in any scientific journal was that by Mr. R. C. Taylor, in the American *Journal of Science and Art*, for April, 1838. In 1843 a longer memoir, by Mr. S. Taylor, appeared in the same journal. Professor J. Locke gave some account of them in a "Report on the Mineral Lands of the United States," presented to Congress in 1840. Messrs. Squier and Davis devoted to the same subject a part of their work on the "Ancient Monuments of the Mississippi Valley";* and finally, the seventh volume of the "Smithsonian Contributions" contains the work by Mr. Lapham, which gives the most complete account of these interesting objects.†

These singular monuments exist chiefly in the southern counties of Wisconsin. They occur from the Prairie du Chien on the Mississippi, eastward towards Fond du Lac on Lake Winnebago, and Milwaukie on Lake Michigan, over an area of more than 148 miles in length and 60 in breadth.‡

The mounds are in the forms of men, buffaloes, elks, bears, otters, wolves, racoons, birds, serpents, lizards, turtles, and frogs. Many of the representations are spirited and correct; but others, probably from the action of time, are less definite.§

They are usually clustered in groups. Their height above the surrounding soil is not considerable, ranging from eighteen inches to six feet. In the county of Dane (State of Wisconsin) there is a group of these mounds, representing a herd of buffaloes, (?) each thirty-five yards in length. A human figure, forty-eight yards long, with its legs apart, is to be seen in another place. These animal-mounds have been thought by Schoolcraft to be connected with the Indian "totemic" system.‖

Several of the animal-mounds have been opened, and in

* Pp. 124—133.

† 'Prehistoric Times,' p. 222. 'Ancient Monuments of the Mississippi Valley,' pp. 124, 125.

‡ Stated in 'Ancient Monuments of the Mississippi Valley' to be 150 miles in length by 50 miles in width. p. 125.

§ 'Prehistoric Times,' p. 223.

‖ 'Archives of Aboriginal Knowledge,' vol. i., pp. 56, 57. Abbé Em. Domenech, 'Seven Years' Residence in the Deserts of North America,' vol. i., pp. 353, 354, and 358, 359.

making the streets of Milwaukie many were entirely removed; but the only result has been to show their non-sepulchral character, and that, excepting by accident, they contain no implements or ornaments.* "The animal-shaped mounds have never been found productive in ancient relics. It was probably for purposes other than the burial of the dead that these structures were made."†

Conical Mounds.

Dr. M. W. Dickeson has examined nearly one hundred and fifty tumuli in the south-western States, chiefly in Mississippi, although some are situated in Alabama, Louisiana, and Texas. These tumuli vary from three to ninety feet in height, and from twelve to three hundred feet in diameter at the base. Large numbers of stone arrow-heads were met with in them, in one instance about twenty bushels of arrow-heads were found within the space of a few feet. In a small mound, in Adams county, Dr. Dickeson found three large jars, holding upwards of ten gallons of nicely-worked stone arrow-heads. Dr. Dickeson sent a catalogue of his collection to the Hon. J. Russell Bartlett, who has given the following abstract from it, in order to afford an idea of the number and variety of the objects:—

6000 arrow-heads, of jasper, chalcedony, obsidian, and quartz.
150 arrow-heads, finely polished, under one inch in length.
25 arrow-heads, finely polished,‡ under half an inch in length.
1600 unfinished arrow and spear-heads.
250 small stone axes.
40 quoits, weights, &c.
20 paint mullers.
10 corn grinders.
3 large stone mortars.

These specimens are deposited, together with the extensive Collection formed by Dr. Dickeson, in the Museum of the Academy of Natural Sciences, Philadelphia.§

* 'Prehistoric Times,' p. 225.

† Lapham, 'Antiquities of Wisconsin,' p. 16.

‡ This polish may be due to the natural lustre of the material of which the arrow-heads are made. It is less likely to be a shining patina arising from age, but Dr. Dickeson can scarcely mean that these weapon-heads were artificially polished.—E. T. S.

§ J. R. Bartlett, 'Progress of Ethnology,' in 'Transactions of the American Ethnological Society,' vol. ii., pp. 8—13.

The Indians do not pretend to any correct knowledge of the constructors of the tumuli. The Quapaws have a tradition, that a nation, differing much from themselves, inhabited the country many hundred snows ago, when game was abundant, and when there were no hostile neighbours to render war necessary. They then, merely for sport, collected the earth into heaps, which have ever since remained, and have been used by other nations, who succeeded to their possession, as the depositories of their dead. According to another legend, they were constructed to protect the red men from the attacks of wild beasts, which formerly were very large, and used to destroy many of the Indians; but that finally the Great Spirit commiserated his red children, and taught them the use of the bow and arrow; they were then able to defend themselves, and the mounds were no longer needed. The Indians know that interments have taken place in the mounds, and many believe them to have been the depositories of the dead for an extinct nation of men.*

The Winnebagos, the last occupants of the region around Aztalan, always answer in the negative by a significant shake of the head, when asked if they can tell who erected the mounds.†

The Sioux have a curious superstition respecting a mound, near the mouth of Whitestone river, which they call the Mountain of Little People, or Little Spirits; they believe that it is the abode of "little devils, in the human form, of about eighteen inches high, and with remarkably large heads; they are armed with sharp arrows, in the use of which they are very skilful. These little spirits are always on the watch to kill those who should have the hardihood to approach their residence. The tradition is, that many have suffered from their malice, and that, among others, three Maha Indians fell a sacrifice to them a few years since. This has inspired all the neighbouring nations —Sioux, Mahas, and Ottoes—with such terror, that no consideration could tempt them to visit the hill."‡

* Hunter, 'Manners and Customs of the Indian Tribes,' Philadelphia, 1823, pp. 315, 316.

† Lapham, 'Antiquities of Wisconsin,' p. 47.

‡ Lewis and Clarke, 'Travels to the source of the Missouri River.' London, 1814. P. 40.

MOUNDS OF OHIO.

A systematic examination of a considerable number of tumuli in the Scioto Valley, Ohio, was undertaken some years since by Messrs. Squier and Davis. A full description of these mounds, and of the objects obtained during the excavations, has been published.* Squier and Davis class the mounds as—

1. Altar mounds.
2. Mounds of sepulture.
3. Temple mounds.
4. Anomalous mounds.

Altar or Sacrificial Mounds.

These mounds are said to occur only within, or in the immediate vicinity of, ancient earthworks forming enclosures.† They contain symmetrical "altars" of burnt clay or stone, on which are deposited various remains, which in all cases have been more or less subjected to the action of fire. These "altars" are not of uniform size and shape. Some are round; others elliptical; others square, or parallelograms; some are small, measuring

* Squier and Davis, 'Ancient Monuments of the Mississippi Valley,' being vol. i. of the 'Smithsonian Contributions to Knowledge.' Washington, 1848.

† For an account of 'Sacred Enclosures' see 'Ancient Monuments of the Mississippi Valley,' pp. 47—103. Sir John Lubbock has expressed the opinion that some of the circular and square enclosures, classed by Squier and Davis as "Sacred Enclosures," are but the slight fortifications which surrounded villages, and were undoubtedly crowned by stockades, intended less to stand a regular siege than to guard against a sudden attack.—'Prehistoric Times,' p. 215.

barely two feet across, while others are fifty feet long by twelve or fifteen feet wide. The usual dimensions are from five to eight feet. The "altars" are in the form of basins, made of a fine clay brought to the spot from a distance. They have seldom been raised more than a foot or twenty inches above the original surface-soil upon which they rest. The clay of which they are composed is usually burnt hard, sometimes to the depth of ten, fifteen, and even twenty inches. Regular strata of sand have been observed in the "altar mounds;" these bands conform to the convex outline of the mound.

Mounds of Sepulture.

These mounds are destitute of "altars," do not occur within enclosures, and invariably cover a skeleton, usually deposited in a rude chamber of timber; occasionally the chamber is of rubble-stone.

Temple Mounds.

Temple mounds are chiefly pyramidal in form, truncated, and generally with graded paths to their tops. In some instances they are terraced. Mounds of this class are not numerous in Ohio.

Along the Mississippi river, and especially as we approach the Gulf, these "temple mounds" increase both in number and in magnitude. In Kentucky they are more frequent than in the States north of the Ohio river; and in Tennessee and Mississippi they are still more abundant.*

Anomalous Mounds.

Anomalous mounds, according to the classification of Squier and Davis, include "mounds of observation" and such as have been applied to a double purpose, or of which the design and objects are not apparent.†

Altar Mounds.

The contents of the "altar" mounds vary considerably. Mound No. 3, "Mound City," ‡ contained a quantity of pottery

* 'Anc. Mon. Miss. Valley,' p. 149.

† Ibid., pp. 173—177, figs. 59—65. 'Prehistoric Times,' pp. 220, 221.

‡ Ibid., p. 142.

sufficient to have formed a dozen vessels of moderate size, two copper chisels, about twenty thin strips of copper, nearly a hundred stone arrow-heads, some flakes, and two carved stone pipes. In Mound No. 8, "Mound City,"* nearly two hundred carved stone pipes were found associated with beads and ornaments of shell and copper. Squier and Davis dwell upon this "sorting" of relics—instead of a *variety* of objects, such as would represent the worldly belongings of an individual, being found upon *each* "altar," there are upon one a large number of pipes, upon another numerous pieces of galena, upon a third a quantity of pottery, upon a fourth a collection of spear-heads, whilst others are destitute of remains, with the exception, perhaps, of a thin layer of some carbonised substance. From this "sorting" of relics, Squier and Davis draw the inference that these masses of burnt clay were altars, and that the objects found upon them were of the nature of sacrificial offerings.

Sir John Lubbock, however, does not fully accept this conclusion; he thinks that the altar-containing mounds, although they differ in many respects from ordinary tumuli, are of a sepulchral and not of a sacrificial character.

The chambers in certain ancient European tumuli, as suggested by Professor Nilsson,† have probably served as dwelling-places. When the owner died, the chamber received his remains; was heaped over with earth, and thus the house became a tomb.

If we imagine that the "altars" were the clay floors of dwellings, and that (as among the Buraets) a good fire was kept constantly blazing upon them, we should in such a house, if used finally as a sepulchre, have an "altar" not unlike those met with in the Ohio mounds.

Neither does Sir John Lubbock attach much importance to the presence of large numbers of pipes in one mound, and large quantities of some other class of relics in another mound. He argues, from the excellence of the workmanship in pipe-carving, that a sub-division of labour had already begun with the mound-builders; that Mound No. 8, "Mound City," may be but the sepulchre of some celebrated pipe-maker by profession, whose surviving friends would place in his grave, not one or two pipes, but his whole stock-in-trade; in the belief that he

* 'Anc. Mon. Miss. Valley,' p. 152.

† 'Stone Age of Scandinavia,' pp. 124—168.

would gain his living by bartering* pipes in the land of spirits as he had already done in this world.†

Pipe-making is a distinct business among some Indian tribes, or rather certain men attain an excellence in pipe-making, arrow-head making, or some other branch of handicraft, not shared by the rest of their tribe, and hunters gladly exchange meat and other necessaries for their skilfully-made wares. Among the Chippewas there is an old Indian whose name is *Pabahmesad*, or the "Flier," but from his skill in making pipes he is more commonly known as *Pwahguneka*—"he-makes-pipes."‡

Weapons were buried with the dead hunter, in order that he might supply himself with food in the mysterious hunting-grounds to which he was supposed to have gone. He could use but few weapons, and all he was likely to need were buried with him; sometimes even unworked flint blocks were placed at hand, in order that he might replenish his stock from time to time. His success would depend, as it did during his life, upon his skill, rather than upon the number of his weapons. If, however, we imagine that objects were placed in the grave in order that they might serve for barter, we can understand the reason for placing as many as two hundred pipes in a single mound, instead of the single pipe needed for an individual smoker.

Had the objects deposited upon the "altars" in the Ohio mounds been of a sacrificial nature, there is no doubt that they would have been the best of their kind; imperfect and unfinished pipes would not have been worthy offerings to a divinity. The departed pipe-maker, on the other hand, could finish his pipes at leisure in the spirit-land, and as *cores* of hornstone, as well as finished hornstone implements, were found in Mound No. 2, "Clark's Work," so were unfinished as well as finished

* The existence of the practice of barter among some prehistoric races appears to be proved by the occurrence of objects among their remains, which are not natural productions of the district in which the particular people lived. This has been already noticed (pp. 163, 164). A singular traffic has been mentioned by Mr. Hardcastle. A tribe of Indians who inhabit a secluded mountainous region, and will not allow strangers to enter their country, carry on a traffic with the people of the neighbouring valley by exchanging a kind of red pepper for dogs. The parties never meet, but go in turn to the top of the ridge, taking what they find, and leaving their own articles in exchange. —'Bull. Amer. Ethno. Soc.,' April, 1862, p. 15.

† 'Prehistoric Times,' pp. 218—220.

‡ Wilson, 'Prehistoric Man,' vol. ii., p. 15.

pipes found in Mound No. 8, "Mound City." Two of these unfinished stone smoking-pipes are represented by Figs. 17

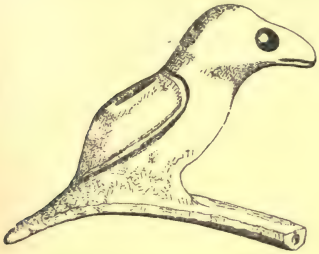


FIG. 17.

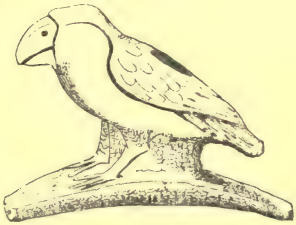


FIG. 18.

and 18. Unfortunately Fig. 17 did not reach England with the other specimens forming the "Squier and Davis" Collection. The illustration is, therefore, copied from Fig. 176, "Ancient Monuments of the Mississippi Valley." "It seems to have been rubbed or ground into its present shape, and is yet unpolished."*

Fig. 18 represents No. 10, Case C 37.† This specimen is unfinished, and plainly exhibits the process adopted by the ancient artist in bringing it into its present state. None of the more minute details have as yet received any attention. The base and various parts of the figure exhibit minute striæ, resulting from rubbing or grinding; but the general outline seems to have been cut with some sharp instrument, the marks of which are plainly to be seen, especially at the parts which it would be difficult or impracticable to reach with any polishing tool. The lines indicating the feathers, grooves of the beak, and other delicate parts, are sharply cut in the stone at a single stroke. A pointed tool has been used, and the marks are visible where it has occasionally slipped beyond the control of the carver. Indeed, the whole appearance of the specimen indicates that the work was done rapidly by an experienced hand, and that the various parts were brought forward simultaneously. The freedom of the carving could only result from long practice; and, from it and other examples, "we may infer that the manufacture of pipes had a distinct place in the industrial system of the mound-builders."‡

* 'Anc. Mon. Miss. Valley,' p. 265.

† It is engraved in the 'Anc. Mon. Miss. Valley,' fig 182.

‡ 'Anc. Mon. Miss. Valley,' pp. 267, 268.

The stone smoking-pipes recovered from the "altars" of the Ohio mounds are most interesting. They are quite unlike the pipes made by any other known race of men. Their characteristic form is that of Figs. 17 and 18; the receptacle for the tobacco is on the middle of a semi-lunar base, about three inches in length, one end of which forms a handle, whilst a drilled hole in the other end communicates with the central bowl. The head of the carved figure, if any, is turned towards the drilled end. From the size of the hole, it is probable that the pipe was smoked without the use of a tube. Some of these pipes had the receptacle for tobacco of simple form, like Fig. 19. In Case E 5 some stone pipes, still in use in various parts of America, are shown for comparison.

FIG. 19.

"MOUND CITY."

Some of the most interesting objects in the Collection from the American tumuli were obtained from a group of mounds, called by Squier and Davis "Mound City." "Mound City" is on the left bank of the Scioto River, four miles north of the town of Chillicothe, Ross county, Ohio. There are twenty-

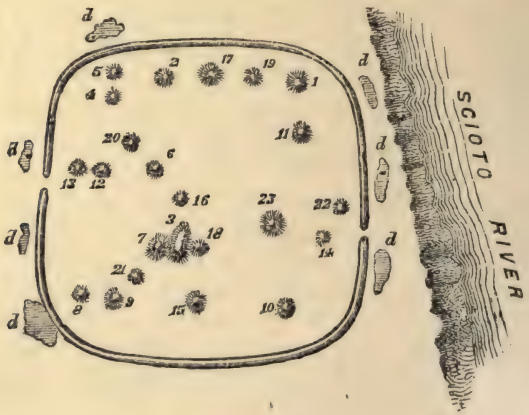


FIG. 20.

three mounds in this group; these are surrounded by a bank between three and four feet high, unaccompanied by a ditch.

The outline of the bank is nearly square, with rounded angles (see Fig. 20).* Broad and deep pits, *d*, from which the earth has been taken to form the mounds, are on the outside of this bank.

Mound No. 1, "Mound City."

This mound is seven feet in height, and is fifty-five feet in diameter at the base. The "altar" in Mound No. 1 was of burnt clay, perfectly round (see Fig. 21). It measured, from *c* to *d*, nine feet in diameter; from *a* to *e*, five feet; the height, from *b* to *e*, twenty inches; the dip of curve, *a*, *r*, *e*, nine inches. The substance of the altar is burnt throughout, though in a greater degree within the basin. This basin was filled with ashes, intermixed with well-made pottery, ornamented with incised patterns, of which No. 1 (S and D 8), Case E 6, is an example; and with the copper discs upon Tablets 2 and 3. Above this deposit, and covering the entire basin, was a layer of mica, in sheets, overlapping each other, upon which, immediately over the centre of the basin, was heaped a quantity of burnt human bones, probably belonging to a single skeleton. Three

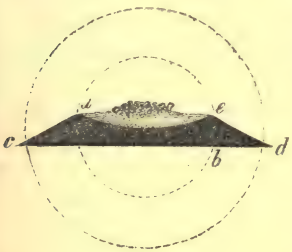


Fig. 21.

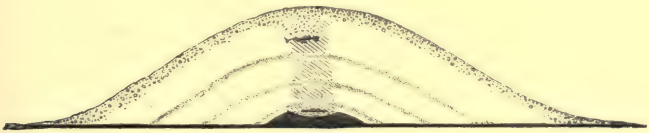


Fig. 22.

strata of sand were observed in this mound. The relative positions of these deposits are shown upon the section of the mound,

* The plan of "Mound City" is copied from Plate xix, 'Ancient Monuments of the Mississippi Valley.' The description is abridged from that given in the same work, pp. 54, 55.

Fig. 22, and upon the section of the altar, Fig. 21. The layers of mica and calcined bones were peculiar to Mound No. 1, and were not found in any other of the class. A secondary interment, by inhumation, had taken place in Mound No. 1, at the point marked in Fig. 22. This secondary interment is, probably, of recent date.*

In Wisconsin the modern Indians sometimes deposit their dead in the ancient mounds, protecting the body with a covering of stakes.

"Many of the mounds have been opened for the burial of the remains of Indians recently deceased; and we saw on one mound three graves but lately formed. They were secured from the ravages of the wolves and other animals by logs of wood held in their places by four stakes. Only one kind of wood is used on the same grave. One grave was covered with logs of iron-wood (*Ostrya virginica*), the other two with those of oak; even the stakes were of the same wood as the logs. These logs are from four to six inches in diameter and about four feet and a half long."†

Upon several of the mounds near Rock River, Mr. Lapham observed very recent graves of the Potawattomies, covered with slabs or stakes, after the usual method of modern Indian burial. One was protected by planks placed in a sloping manner, so as to meet at the top like the roof of a house. Another had a kind of pen made of sticks about six inches in diameter. These graves show the peculiarity of having but one kind of wood on each grave; the planks were of oak, the pen was of elm. The larger and more conspicuous mounds are generally selected by the Indians for the burial of their dead.‡

Mound No. 2, "Mound City."

This mound is ninety feet in diameter at the base, seven feet and a half in height, and is remarkably broad and flat. The

* Mound No. 1 is described in 'Anc. Mon. Miss. Valley,' pp. 144—147. Figs 29, 30.

† Lapham, 'Antiquities of Wisconsin,' p. 19, plate viii. See also p. 27, from which it appears that a similar interment was made by the Indians upon an ancient mound at Waukesha, near the Pishtaka river, about the year 1836.

‡ 'Antiquities of Wisconsin,' p. 55.

altar in No. 2, unlike that in No. 1, was in the form of a regular parallelogram, see Fig. 23. At its base it measured ten feet in length by eight in width; at the top it was six feet by four. Its height was eighteen inches, and the dip of the basin was nine inches. Within the basin there was a deposit of ashes, three inches thick, and in it were the fragments of pottery upon Tablets 4 to 10 (S and D 9, 11, 12), Case E 6; and some shell and pearl beads, such as those in Case B 34, upon Tablets 4 to 7. Two strata of sand were observed in this mound, the lower of which in this, as in several other instances, rested directly upon the outer sides of the altar, see Fig. 24. Two recent secondary interments, by

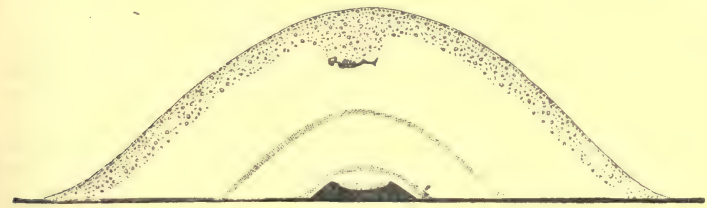


FIG. 23.

FIG. 24.

inhumation, had taken place in this mound. The skeletons were found at the depth of three feet from the surface of the mound. They were placed side by side, the head of one resting at the elbow of the other. Under and about the heads of both were deposited some large rough fragments of greenstone. With the skeletons were several stone hatchets, stone gouges, a very fine flake of hornstone about the size of the palm of the hand, and a number of implements made of bone and elk-horn; see specimens upon Tablets 15 to 25, Case B 34, and upon Tablets 16 to 19, Case D 19.*

MOUND NO. 3, "MOUND CITY."

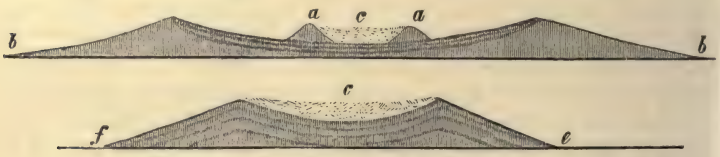
Mound No. 3 is egg-shaped in form, and measures 140 feet

* Mound No. 2 is described in 'Anc. Mon. Miss. Valley,' pp. 147, 184, figs. 31, 32.

in length, by fifty and sixty feet respectively at its greater and smaller ends; it is eleven feet in height. Fig. 25 is a section of this mound. In sinking the shaft, *a*, at the depth of about eighteen inches, a secondary interment was discovered. The skeleton was in a sitting posture, the head resting on the knees. No relics were found with the skeleton. Shaft *c* revealed another secondary interment, at about the depth of two feet; only the lower jaw of the skeleton was discovered, and side by side with it was the small rude earthen vessel No. 28, Case E 6. Two sand strata were observed in this mound. Although the "altar" was not fully exposed, yet enough was uncovered to ascertain its character and extent, as will be noticed by the shafts which were sunk, *a*, *b*, *c*, *d*, Fig. 25. Forty-five feet

FIG. 25.

of its length was exposed, and, in one place, its entire width, which was eight feet across the top, by fifteen at the base. The length of the altar could not have been much less than sixty feet. Fig. 26 is a longitudinal section of the altar, *b*, *c*, *b*. The



FIGS. 26 AND 27.

relics were found in the inner basin, *c*. The altar was burnt to the depth of *twenty-two* inches. Upon careful examination it was found that three altars had been built, one upon another, as if one had been used for a time, until, from defect, or some other cause, it was abandoned, when another was formed over it. This peculiarity is shown in the cross section, Fig. 27, *f*, *e*. The basin *a a*, Fig. 26, was constructed subsequently to the erection of the altar. The partitions, *a a*, were scarcely burnt through, while the altar immediately beneath them was burnt to great hardness. In the outer basin of the altar were found the traces of a number of pieces of timber, four or five feet in length,

and six or eight inches in diameter. These had been partially burnt, and the carbonised surface had preserved their casts in the earth, although the wood itself had entirely perished. The pieces of wood had been covered up whilst still burning, for the earth around them was slightly baked. The relics found mixed with the ashes in the central basin consisted of fragmentary pottery, some leaf-shaped flint implements, an arrow-head of obsidian, a number of arrow-heads of hyaline quartz, two copper chisels, several tubes formed of thin strips of copper, two carved stone smoking-pipes, and the other objects exhibited in Cases C 34 to C 36. Only a single fragment of partially calcined bone was found on the altar. It was the *patella* of the human skeleton.*

Mound No. 4, "Mound City."

This mound is oblong in shape, and measures at the base ninety feet in its longest and sixty feet in its shortest diameter. It is six feet in height, and has two sand-strata, as shown

Fig. 28.

in the section, Fig. 28. The altar in this mound was remarkable from its depth, which was twenty-two inches, the hollow of the basin sinking a foot or more below the original surface of the soil. Nothing was contained in the basin, except a layer, *a*, about five inches in thickness, of a substance resembling lime mortar. Mingled with this were fragments of a few calcined shells.† It will be observed that the altar in Mound No. 1 was circular, in Mound No. 2 it was in the form of a parallelogram, and in Mound No. 4 it was square.

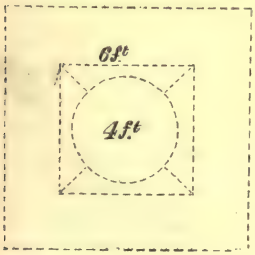


Fig. 29.

* 'Anc. Mon. Miss. Valley,' pp. 149—152, figs. 34—36.

† Ibid., pp. 148, 149, fig. 33.

Mound No. 5, "Mound City."

This mound is by the side of Mound No. 4, the bases of the two uniting; they are also both of the same size and form. The "altar," however, in No. 5 is more like that in No. 2, Fig. 23, although somewhat smaller. It contained about thirty pounds weight of galena in pieces ranging from two ounces to three pounds; also several lumps of fine clay. Around this deposit there was a quantity of charcoal. Although the galena was but slightly burnt, yet the "altar" bore marks of intense heat, showing that it had been previously subjected for a considerable period, or at frequent intervals, to the action of fire.*

Mound No. 7, "Mound City."

This mound is much the largest within the enclosure. It measures seventeen feet and a half in height, by ninety feet in diameter at the base. The details of the section are shown in

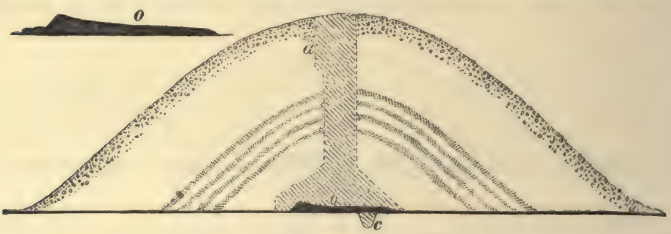


Fig. 30.

Fig. 30. At the point *a* two copper hatchets were found, Nos. 23 and 29 (S and D 5 and 3), Case E 6. The dotted lines indicate the presence of four layers of sand, rather more than a foot apart. At the depth of nineteen feet a smooth level floor of clay, slightly burnt, was found; this was covered with a layer of sand, about one inch in thickness. Resting on this was a crescent-like figure, formed with sheets of mica, which overlapped each other like the scales of a fish, and presented the appearance of Fig. 31. The sheets are about ten or twelve inches in diameter. See No. 24, Case E 6. The crescent was

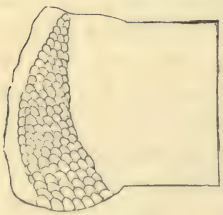


Fig. 31.

* 'Anc. Mon. Miss. Valley,' p. 149.

about twenty feet from horn to horn, and about five feet in width. The outer edge of the crescent rested on an elevation, or ridge, of sand, six inches in height, as shown upon the supplementary section, *o*, Fig. 30. The clay floor of this mound was but a few inches in thickness.*

Mound No. 8, "Mound City."

The greater part of the stone smoking-pipes in the Collection were obtained by Squier and Davis from this mound, of which Fig. 32 is a section.† The mound is small, a stratum of sand,

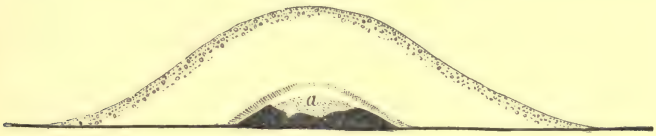


Fig. 32.

indicated by the dotted line, overlaid the altar, which is represented black. Immediately under the sand was a layer, a few inches thick, of burnt loam; beneath this, in the hollow, *a*, was a deposit of ashes, containing about 200 stone smoking-pipes, many pearl and shell beads, several discs and tubes of copper, and a number of copper ornaments covered with silver.

The altar, Fig. 33, was six feet two inches in length and four feet in width. At the point indicated by a dotted oval in Fig. 33 there was a depression of about six inches below the general level of the basin. The whole of the objects found upon the altar had been exposed to a heat sufficiently intense to fuse some of the copper objects.‡ The pipes also are greatly injured, many of those made of limestone, or containing calcareous matter, having been reduced to the condition of caustic lime, whilst others have been split into pieces, such as those in the glass dishes, Nos. 11, 18, and 19, Case E 6, and No. 2, Case E 9.

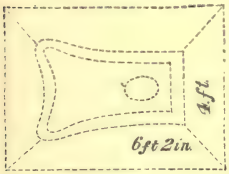


Fig. 33.

* 'Anc. Mon. Miss. Valley,' pp. 154, 155, figs. 41, 42.

† Ibid., fig. 37, pp. 152, 153.

‡ It is strange, as suggested by Squier and Davis, that the mound-builders did not profit by the hint thus given—they appear only to have treated copper as a malleable stone.

Mounds, Nos. 6 and 9, "Mound City."

No relics were found upon the altars of these mounds, neither did they contain ashes or charcoal.*

Mound No. 18, "Mound City."

In this mound the usual altar was present, and upon it was a thin carbonaceous deposit, but no relics were found. Traces of a secondary interment by cremation were observed. †

Mounds Nos. 14, 15, 16, 19, 20, 21 and 23, "Mound City."

These mounds are very small, the largest not being more than three feet in height, and they are all destitute of "altars." In each, burnt human remains were found, resting upon the original surface-level, in no case exceeding the bones of one skeleton. The body appears to have been burnt elsewhere, for there is a total absence of all trace of fire, except upon the bones themselves. In Mound No. 19 these burnt bones had been deposited in a cist sunk in the soil. Squier and Davis suggest that the bodies were *burnt* upon the "altars," and that the calcined bones were then collected and buried beneath these minor mounds. A difficulty arises as to why the "altars" themselves, if such they were, should ultimately have been heaped over with earth, after they had served, time after time, for this purpose. Altars or "brick hearths," not covered with mounds, are said to have been discovered in America. One which existed near the town of Marietta, Ohio, is mentioned by Squier and Davis; it was surrounded by a low bank, about 100 feet in circumference.‡

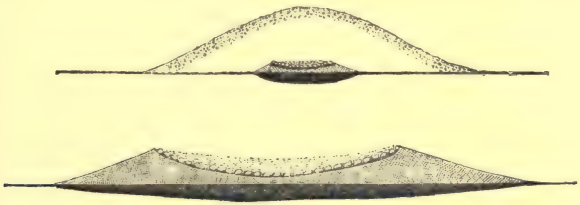
Close to the town of Zuñi Viegà, New Mexico, in a cedar forest, there are some oval altars of earth, very low, and between two and three yards in length. These altars are described as having, at one of the extremities, "an arrow ornamented with feathers and a sort of network." At the other end, stuck into the ground, is a cedar stake carved "in the open-work style;" and in the middle of the altar, lying horizontally, is another piece of cedar wood, carved in a similar manner,

* 'Anc. Mon. Miss. Valley,' pp. 158, 159.
† Ibid., pp. 153, 154, figs 39, 40.
‡ Ibid., pp. 159, 160.

and surrounded with shells, and arrows of small size. Some of these altars are of great antiquity, and the Indians allow no strangers to touch them.* Nothing, however, is said of fires having been lighted upon these earth-altars of New Mexico.

Solitary Mound near "Mound City."

This mound is about a quarter of a mile to the south of "Mound City." It is surrounded by a ditch and bank, enclosing an area of twenty-eight acres, the mound being in the centre. The height of the mound has been reduced by cultivation. It now stands about five feet above the level of the soil, and is about forty feet in diameter at the base. The "altar" in this mound differs from those already described, and appears to have been formed at different intervals of time. Fig. 34 is a section of the mound, and Fig. 35 is a section of the altar. A



Figs. 34 and 35.

circular cist, thirteen feet in diameter and eight inches in depth, was sunk below the level of the surface soil; this was filled with fine sand, which was carefully levelled, the upper surface being perfectly horizontal, as shown by the dark portion in Figs. 34 and 35. Upon this, fire appears to have been kept burning sufficiently long to discolour the sand to the depth of an inch. After this had taken place, a basin-shaped "altar" of sand was formed upon the horizontal sand-bed; this basin measured seven feet in diameter, and was eight inches in depth; it was carefully paved with small round stones, each rather larger than a hen's egg, placed with great exactness, and firmly imbedded in the sand. Upon this paved altar some ashes, containing human bones, were found, and ten copper armlets, placed in two heaps, five in each, encircled some calcined bones. On the western slope of the altar were two

* Abbé Em. Domenech. 'Seven Years' Residence in the Deserts of North America,' Vol. 1, p. 213.

thick plates of mica.* Squier and Davis only met with one other mound in which the altar was covered with stones. In this mound, No. 5, "Clark's Work," there was also a layer of stone slabs, following the outline of the mound, at the depth of about three feet from the surface, in a similar manner to that of the layers of sand in the mounds previously described.†

"Clark's Work."

"Clark's Work," on the north fork of Paint Creek, is one of the largest and most interesting in the Scioto Valley. Fig. 36 gives a general plan of this group of mounds, and of the embankment which surrounds them.‡

"Clark's Work" is in the form of a parallelogram, 2800 feet long by 1800 feet broad, with one corner somewhat rounded. The semi-circular embankment, containing the Mounds Nos. 5 to 8, is two thousand feet in circumference. The embankments measure together nearly three miles in length, and the works, including the mounds, must have necessitated the excavation and removal of not less than three millions of cubic feet of earth.

Squier and Davis class "Clark's Work" as a work of defence, although they admit that it differs, in position and some other respects, from the other entrenched hills which have come under their notice.§ It is by no means proved, however, that the mound-builders converted this position into a defensive post; this may have been done by some later tribe, who merely availed themselves of the advantageous configuration of the ground. For instance, the level of the soil within the semi-circular enclosure is elevated above the surrounding ground, and the three long mounds, which are united at their bases, form a continuous elevation, thirty feet in height and five hundred feet in length. Such a position would be seized upon at once as a ready-made work of defence, requiring merely the addition of the slight circumvallation and ditch by which it is now surrounded. All the other natural advantages of the position

* 'Anc. Mon. Miss. Valley,' pp. 156, 157, fig. 45.

† Ibid., p. 156, fig. 44.

‡ Ibid., plate x., pp. 26—29.

§ For an account of 'Works of Defence,' see 'Anc. Mon. Miss. Valley,' pp. 9—46.

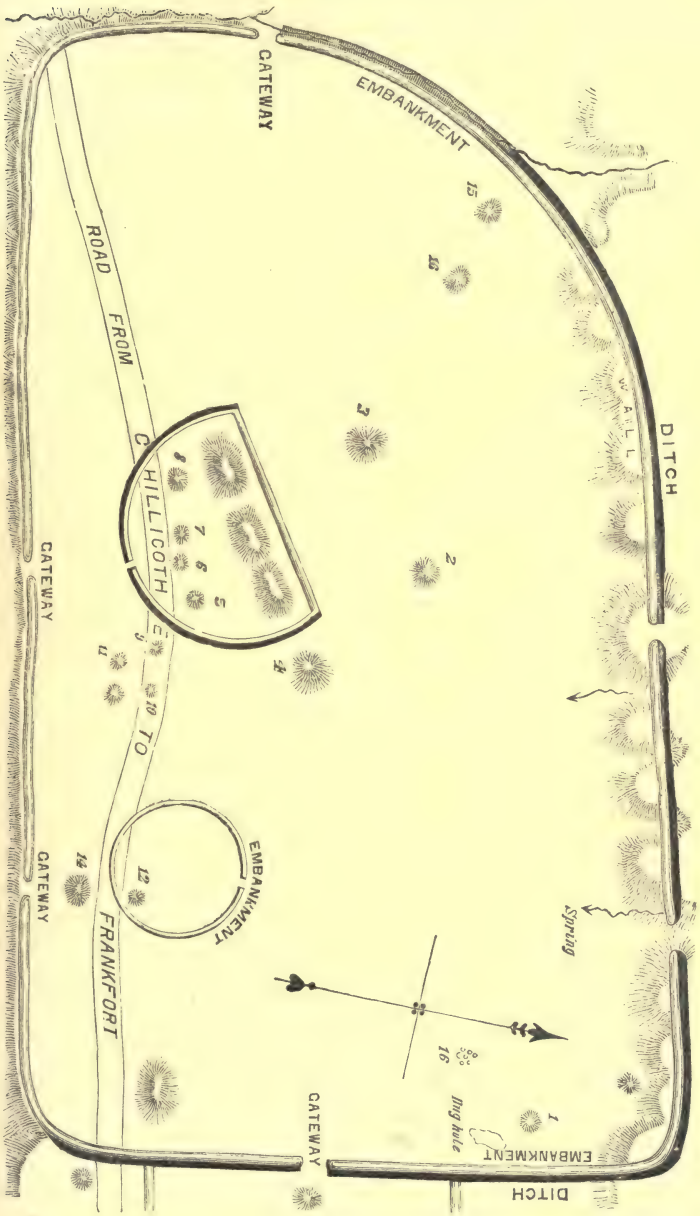

GATEWAY
EMBANKMENT
WALL
DITCH
ROAD FROM
CHILLICOTH
TO
FRANKFORT
EMBANKMENT
GATEWAY
GATEWAY
GATEWAY
Spring
Dug hole
EMBANKMENT
DITCH

FIG. 36.

were secured in constructing the outer work, as will be seen by reference to the plan, Fig. 36, and no doubt the mounds were merely utilised as hills. The way in which they are scattered, both within and without the entrenchment, appears to confirm this view. The mounds may have been, and probably were, constructed at an earlier period than the entrenchments, and perhaps by a totally different people. Squier and Davis, however, regard "Clark's Work" as a fortified town or city of the ancient mound-builders.*

Mound No. 1, "Clark's Work."

This mound, although very rich in relics, was one of the smallest examined. It was not more than three feet in height. No "altar" was found in it. The relics appear to have been placed upon the surface of the soil, which was much burnt, over a space about fifteen feet broad. A bed of earth, about a foot in depth, was heaped over the relics. Upon this a layer of small stones was placed; these stones were covered by a layer of earth about two feet in thickness. In Mound No. 1 some stone pipes, Nos. 12 and 13, Case E 6, were found, the bowls of which were in the form of coiled serpents. These were carefully enveloped in sheet mica and copper. Some fragments of bone, with carving upon them, upon Tablets 2 to 4, Case B 33; a large number of fossil sharks' teeth, upon Tablets 5 and 6, Case B 33, and other objects were also found in this mound.†

* According to Squier and Davis, the ditch, when present, in the "Sacred Enclosures" is *inside* the embankment, whereas in works of defence it is *outside*. Dr. Wilson also follows Sir R. C. Hoare in considering the position of the ditch as being a distinguishing mark between military and religious works. But Catlin mentions that in the Mandan village he visited the ditch was *inside* the embankment, and it was so placed in order that the warriors might be sheltered by the bank when shooting their arrows through the stockade. Clearly, therefore, in America at least, the relative position of the ditch and bank alone cannot guide us in distinguishing between these two classes of earthworks The defensive earthworks of America, however, usually occupy hill-tops, and situations capable of being easily defended, precisely as in England and elsewhere; whereas "Sacred Enclosures" are generally found on "the broad and level river-bottoms, seldom occurring upon the table-lands, or where the surface of the ground is undulating or broken."—'Prehistoric Times,' p. 209.

† 'Anc. Mon. Miss. Valley,' pp. 157, 158.

Mound No. 2, "Clark's Work."

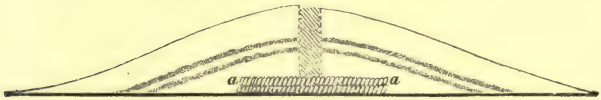


Fig. 37.

This mound is remarkably broad and flat. It measures about eighty feet in diameter, and is no more than six or seven feet in height. Two strata of sand were observed, but no trace of an "altar" was met with. In its place were two layers of hornstone cores and implements, placed side by side, a little inclining, one layer resting immediately upon the other, as shown in Fig. 37, *a*, *a*. An excavation, six feet in length by four in breadth, exposed upwards of six hundred of these implements, but the full extent to which they reached on all sides was not ascertained. Some of these implements are shown in Case A 51, Nos. 1 to 8.*

Mound No. 5, "Clark's Work."

In this mound the "altar" was covered with stones, and instead of the usual sand-stratum, there was found a layer of flat stones corresponding to it. The "altar" was composed of earth raised two feet and a half above the original level of the soil. It was five feet in length by three feet four inches in breadth; the sides sloped at an angle of nearly thirty degrees. This "altar" was faced on the top and on the sides with slabs of stone, quite regular in form and thickness, and which, although undressed, were closely fitted together. The stone is known as the Waverley sandstone, a variety underlying the coal series, thin strata of which cap the hills bordering these valleys. The modern Indians had opened the mound, and buried one of their dead on the slope of the altar. The marine shell (*cassis*) which was found in this mound was probably placed there by them; it is shown in Case E 6, No. 26. A few pearl beads and other objects, which formed part of the original deposit, were recovered. The "altar" bore the marks of fire.†

* 'Anc. Mon. Miss. Valley,' p. 158, fig. 46.

† Ibid., p. 156.

Mound No. 9, "Clark's Work."

This mound has several peculiar features. The "altar," *a*, instead of occupying the centre, was placed considerably towards one side, and a deposit of charcoal, *c*, filled the corresponding opposite side; as shown in Fig. 38. A stratum of sand curved

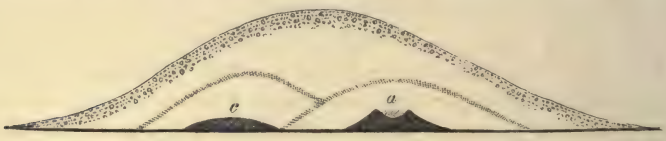


Fig. 38.

over the "altar," and a second band of sand curved over the charcoal. The "altar" was the smallest met with. It was round, and did not measure more than two feet in diameter. Notwithstanding its small size, numerous relics were found on it. Among these, in Case B 33, are the obsidian spear-heads, Tablets 22 to 26; the scrolls of mica, Tablets 27 to 30; some small bone implements, Tablet 20; some pearl beads, and some thin narrow slips of copper. The relics were covered with a layer of charcoal, about six feet in diameter, which had been covered up with earth while burning.*

"Altar" mounds resembling those of Ohio probably exist in other parts of America. Mr. Donald Gunn has described one on the east side of Red River, near Red River Settlement, Hudson's Bay territory, which was opened in October, 1866. Some secondary interments were met with, and, beneath these, upon the level of the surface soil, there was "a floor of very smooth and hard white mud, which appeared to have been hardened by the action of fire." On this clay floor were "four or five skulls lying on the face; a number of small bones, those of fingers and toes; an earthen kettle, with a shell in it, such as live at present in this river; bones of the beaver; two pipes of blue stone, without a perforation; three ornaments made of shell or bone; one perforated shell; and a few shell-beads." The Indians of the neighbourhood have no traditional knowledge relating to the mounds, but say that they are the remains of mud dwellings, such as are used now by the Mandans on the Upper Missouri.†

* 'Anc. Mon. Miss. Valley,' pp. 155, 156, fig. 43.

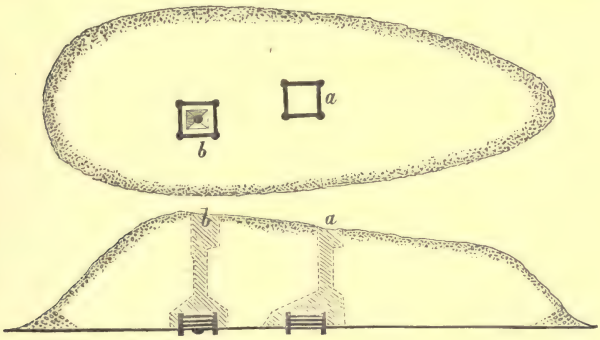
† 'Smithsonian Report,' 1867, p. 399.

Mr. J. Dille has described some small mounds, existing in the State of Missouri, which he regards as being the remains of mud dwellings. They are usually of an oval form, measuring about twenty-five and eighteen feet in their two diameters, and no more than from twelve to eighteen inches in height. They are very numerous, particularly about the head-waters of the St. Francis River, and are always near streams and water-courses. They are invariably arranged in straight lines, with broad streets intervening between them, crossing each other at right angles. Sometimes as many as two hundred of these mounds occur in a single group. Mr. Dille has excavated several of these small mounds, but only succeeded in finding charcoal and a few fragments of pottery.*

Mounds of Sepulture. †

Mound *c—e*, ‡ Liberty Township, Ross County, Ohio. §

This tumulus is in form an irregular oval, one hundred and sixty feet in length, ninety feet in breadth at its larger end, and twenty feet in height. The excavation, *a*, Figs. 39 and 40,



Figs. 39 and 40.

* 'Anc. Mon. Miss. Valley,' pp. 136—138. See also 'Lewis and Clark,' *l.c.*, pp. 26—48; Catlin, 'North American Indians,' vol. i., p. 82; Breckenridge, 'Voyage up the Missouri,' p. 248; Charlevoix, 'Travels in Canada,' vol. ii., p. 127; Lubbock, 'Prehistoric Times,' p. 216.

† See pp. 347, 348.

‡ So marked upon plate xx., 'Anc. Mon. Miss. Valley,' p. 56.

§ This tumulus has been classed by Squier and Davis with the "Anomalous Mounds."

disclosed a cist of timber, eight feet square. Posts, eight inches in diameter, had been driven eighteen inches into the soil, at the outer corners of the cist, as if to support the structure. Of course the wood had perished, but perfect casts of the posts remained in the compact earth which formed the mound. A partly-burned skeleton was found in this cist, and with it the thin copper plate, No. 11, Case A 51, and the stone smoking-pipe, No. 12. The bones appeared to have been enveloped in matting. The floor of the mound, so far as it was examined, was composed of clay, which, after it was laid, had been burnt to considerable hardness. The excavation, *b*, disclosed an "altar" of burned clay at the depth of twenty feet. This "altar" was sunk below the original surface of the soil, and was surrounded by an enclosure of timber, similar to that found in shaft, *a*. In the cist, shaft *b*, several pins, made of the ulna-bones of deer, were found. Squier and Davis have expressed the opinion that other timber cists exist in this mound.*

Mound No. 1. Plate II. "Ancient Monuments of the Mississippi Valley." †

This mound is on the east bank of the Scioto river, about six miles below the city of Chillicothe. It is twenty-two feet in height, and contained a timber cist upon the original level of the soil; in this was a human skeleton, having a necklace composed of a triple row of shell beads and the canine teeth of animals,‡ such as those upon Tablets 8 to 11, Case B 34.

In some of the "sepulchral" mounds, as in this instance and in the mound *c*—*e* last-mentioned, the skeleton was enveloped in bark or matting.§

Upon Tablet 22 (S and D 734), Case C 38, is a portion of bark imbedded in clay, upon which the skeleton in this mound was found.

A mound at Racine, west shore of Lake Michigan, opened by Dr. P. R. Hoy, was found to contain seven skeletons interred in a sitting posture facing the east. They were placed in a simple cist, about eighteen inches deep, excavated in the soil.

* 'Anc. Mon. Miss. Valley,' pp. 178--180, fig. 67.

† Page 3.

‡ 'Anc. Mon. Miss. Valley,' pp. 162, 163, figs. 50, 51.

§ Ibid., pp. 164, 165.

The mound was seven feet in height, and about fifty feet in diameter at the base.*

In a mound (*a*) at Waukesha,† in a cist, sunk two feet below the level of the surface soil, a human skeleton was found in an extended position. Stones had been placed at the sides and over the body, forming a rude sort of coffin. In the left hand was a pipe of baked clay, ornamented with holes around the bowl, and also a quantity of red paint. In the right hand was a smaller pipe, cut from a soft kind of stone. Both pipes are very small, and appear to have been articles of fancy, rather than for use.‡ They are of the form of the ordinary North American Indian pipe, and do not resemble the "mound pipes."

In several other mounds a cist made of stone slabs has been observed.§

Mound No. 3. Plate ii. "Ancient Monuments of the Mississippi Valley."‖

This mound is close to the city of Chillicothe. It is chiefly remarkable from the circumstance, that in it was found the only wedge-shaped (rubbed) stone hatchet obtained from any of the mounds opened by Squier and Davis. The mound is between twenty and twenty-five feet in height. Upon the original level of the ground there was a layer of charcoal and ashes, six or eight feet square, and from six inches to a foot in thickness. In this deposit were fragments of human bones, the stone hatchet already mentioned, several thin pieces of copper which had been hammered, and some fragments of the harder and less common kinds of stone. The heat of fire had been sufficiently intense to almost consume the skeleton; and earth had been heaped over the fire while it was still burning,

* Lapham, 'Antiquities of Wisconsin,' p. 7.

† Ibid., plate xviii., pp. 27, 28.

‡ 'Antiquities of Wisconsin,' p. 83, figs. 39, 40. Other stone smoking-pipes have been figured by Mr. Lapham, all of which are of the types of the pipes used by the modern Indians, figs. 41—51.

§ 'Anc. Mon. Miss. Valley,' p. 167. This feature was remarked by Mr. Lesueur, in some of the mounds opened by him, near New Harmony, Indiana. He found at the base of several a level space, upon which was a right-angled oblong parallelogram, formed of flat stones, set edgewise, and covered over with similar stones. Some decayed human remains were found in these cists. —'Travels in North America,' by Prince Maximilian, p. 80.

‖ Page 3.

for the charcoal was coarse and clear, and the earth was quite baked immediately above the deposit.*

The stone hatchet No. 6 (S and D 377), Case A 50, does not appear to have been exposed to the action of fire. This circumstance, coupled with the fact that it is the *only* example of the type which has been found in the mounds, suggests the idea that it formed no part of the original deposit, but was probably introduced at a later period, and may have been connected with a secondary interment.†

Grave Creek Mound.

The Grave Creek mound is situated on the plain, at the junction of Grave Creek and the Ohio river, twelve miles below Wheeling, in the State of Virginia, and is one of the largest mounds in the Ohio valley. It measures about seventy feet in height, by one thousand in circumference at the base. It was opened in 1838, and was found to contain two sepulchral chambers, one at the base, and another thirty feet above it. These chambers were made of logs, covered with stones. In the lower chamber were two human skeletons, with one of which 650 beads were found, as well as a stone gorget. No ornaments were found with the other skeleton. The upper chamber contained a single human skeleton; with it, not less than 1700 bone beads were found, and 500 small sea-shells (univalves) such as those shown in Case B 34; five copper bracelets, such as in Case C 30; and 150 small plates of mica. But the object which excited the most interest was a small flat stone of an ovate shape, one surface of which bears an inscription in unknown characters. Mr. Schoolcraft visited the mound in 1843; he describes this object as being a compact, hard piece of dark-coloured sandstone. It measures one inch and three-quarters in length, and one inch and a half in breadth; its hardness is sufficient to resist the scratch of a knife. Both surfaces are the result of natural cleavage, the edges only are wrought.

* "In some instances, in which burial by cremation has been practised, the entire skeleton is traceable. In such cases it has been observed that the charcoal occurs beneath as well as above the skeleton, showing that the body had been placed upon a pyre before it was burnt."– 'Anc. Mon. Miss. Valley,' p. 166.

† 'Anc. Mon. Miss. Valley,' pp. 165, 166, fig. 54.

Nos. 34 and 35, Case A 50, are casts of the two surfaces of this specimen.*

Ossuaries.

Large collections of bones, which had belonged to individuals of both sexes and of various ages, are sometimes met with. The description given by various old writers of the solemn "Festival of the Dead" satisfactorily explains the presence of these deposits. It seems that every eight or ten years the Indians were accustomed to meet at some place previously chosen, that they dug up their dead, collected the bones together, and laid them in one common burial place, depositing with them fine skins and other valuable articles.† One of these ossuaries, near the town of Cambia, Niagara county, was estimated to contain the bones of several thousand individuals. Another, near the town of Clarence, Erie county, contained not less than four hundred skeletons. In 1833, Mr. Schoolcraft examined an ossuary in Minnisäs Island, Lake Huron. In 1837, some very extensive ossuaries were discovered at Beverley, twelve miles from Dundas, in Canada West. One of these collections of human bones was eight feet in breadth, forty feet in length, and about six feet in depth. All the bones were promiscuously heaped together, and had belonged to individuals of various ages and of both sexes. Ten or eleven similar deposits of human bones existed on the same ridge of land.‡ Mingled with the bones were marine shells (*Pyrula perversa*, and *P. spirata*), § antique clay smoking-pipes, ‖ shell gorgets, ¶ shell beads, ** amulets, †† and drilled canine teeth of bears and other

* Schoolcraft, 'Observations respecting the Grave Creek Mound, &c.,' in 'Trans. Amer. Ethno. Soc.,' vol. i., pp. 369—408. Figures of both surfaces of the "tablet" are given at page 389. Squier and Davis, 'Anc. Mon. Miss. Valley,' pp. 168—170, figs. 55, 56. Schoolcraft, 'Archives of Aboriginal Knowledge,' vol. i., pp. 124—128. Plate xii., fig. 1. Plate xxxviii., figs. 1—6, plate 39. 'American Pioneer,' vol. ii., p. 197. 'Cincinnati Chronicle,' Feb. 2, 1839.

† 'Prehistoric Times,' p. 216. See also Squier, 'Aboriginal Monuments of the State of New York,' and Squier and Davis, 'Anc. Mon. Miss. Valley.'

‡ Schoolcraft, 'Archives of Aboriginal Knowledge,' vol. i., pp. 106—109.

§ Ibid., vol. i., plate xxxv., figs. 1, 2.

‖ Ibid., vol. i., plate ix., figs. 1, 3.

¶ Ibid., vol. i., plate xix., fig. 3.

** Ibid., vol. i., plate xxiv., figs. 17—24.

†† Ibid., vol. i., plate xxv., figs. 1—7, 9, 11, 23, and 25.

animals.* In some instances the bones appear to have been piled in a pyramidal heap, and then to have been covered with successive layers of clay, charcoal, and earth. A mound of this kind, at Vincennes, Indiana, was opened in 1859; it was sixteen feet in height, and sixty-six feet in diameter at the base. The bones, consisting of skulls, leg-bones, ribs, and vertebræ, were promiscuously heaped together, forming a pile eighteen feet in diameter at the base, and two feet nine inches in thickness towards the middle. This heap of bones was covered with a bed of grey-coloured clay, thirty-three inches in thickness, above which was a layer of ashes, containing traces of calcined bones; resting upon this was a band of ordinary surface soil, twelve inches in thickness, and covering the whole was a second stratum of clay.†

Some of the existing Indian tribes wrap their dead in bark or skins, and place the bodies in a tree or upon a scaffold until the flesh has perished; the bones are ultimately collected and deposited in a general ossuary.‡

Among the Iroquois, the bodies of the dead were each exposed upon a bark scaffolding, erected upon poles, or merely secured to the limbs of a tree.§ When nothing but the bones remained, these were removed either to the former house of the deceased, or to a small bark house by its side, prepared for their reception. In this manner the skeletons of the whole family were preserved from generation to generation. After the lapse of a number of years, or in a season of public insecurity, or on the eve of abandoning a settlement, it was customary to collect these skeletons from the whole community and consign them to a common resting-place. To this custom, which was not confined to the Iroquois, is doubtless to be ascribed the

* Schoolcraft, *l.c.*, vol. i., plate xxv., figs. 26—28.

† William Pidgeon, in 'Smithsonian Report,' 1867, p. 403.

‡ "There are Senecas now (1851) residing at Tonawanda and Cattaraugus, who remember having seen, about sixty years ago, at the latter place, these bark scaffoldings, on which bodies were then exposed. The custom still prevails among the Sioux upon the Upper Mississippi, and among some of the tribes in the far west." 'League of the Iroquois,' pp. 173, 174, *note.*

§ The ancient Scythians did not in all cases bury their dead; some bodies were suspended from the limbs of trees, and were left to putrefy. "Of what consequence," says Plutarch, "is it to Theodorus, whether he rots in the earth, or upon it? Such with the Scythians is the most honourable funeral."

Silius Italicus also mentions this custom:—

"At gente in Sythicâ suffixa cadavera truncis
Lenta dies sepelit, putri liquentia tabo."

"barrows and bone mounds," which have been found in such numbers in various parts of the country. On opening these mounds, the skeletons are usually found arranged in horizontal layers, forming a conical pyramid, the skeletons in each layer radiating from a common centre. In other cases the bones have been promiscuously heaped together without order or arrangement.*

The "gallery-tombs," of Scandinavia are considered by some archæologists to have been constructed for "ossuaries," in which human bones were deposited after the flesh had been removed.† It has been ascertained that these "gallery-tombs"

* 'League of the Iroquois,' pp. 172, 173. At a later period the Iroquois buried their dead in a sitting posture, with the face to the east. Skeletons are still found in this position, in various parts of the State, with a gun barrel resting against the shoulder; thus fixing the period of the interment as subsequent to the first intercourse of this people with Europeans. "Black Hawk" was buried, in accordance with his own request, by being placed on the surface of the ground, in a sitting posture, with his cane clenched in his hands. "His body was then enclosed with palings, and the earth filled in. This is said to be the usual mode of burying the Sac chiefs."—Schoolcraft, 'Personal Memoirs,' p. 613, on the authority of the 'Iowa Gazette,' October (cir. 12th), 1838. Herodotus tells us that the Nasamones of Lybia buried their dead in a sitting posture, watching when one is about to expire, that they may set him up, that he may not die supine.—Herodotus iv., 190.

† The Correguajes Indians adopt a very strange mode of clearing the flesh from the bones of their dead, and a still more strange way of disposing of the bones. When one of these Indians dies, his wife, children, and relatives carefully paint the body. They then walk in procession around it, led by an old woman, who rattles a calabash. During this ceremony they sing and weep, and throw the belongings of the deceased one by one into the fire; if he possessed any animals they are killed, and the plants in his fields are pulled up. The body is then carried to the woods, and is left there for the wild beasts to remove the flesh. After the lapse of four or five days the bones are collected and taken home, the nearest relative carrying the skull on his back hanging by a cord A fire of green *caimito* wood is lighted, into which the bones are thrown and burnt, the ashes are afterwards employed as a pigment with which to paint themselves, the relatives having the first right to its use. 'The Indians of Andaqui,' New Granada, 1854, written by the Presbyter Manuel Maria Albis, in the 'Bull. Amer. Ethnol. Soc.' vol. i., p. 53. Some Brazilian tribes *drink* the dead. "The Tarianas and Tucanos, and some other tribes, about a month after the funeral, disinter the corpse, which is then much decomposed, and put it into a great pan or oven, over the fire, till all the volatile parts are driven off with a most horrible odour, leaving only a black carbonaceous mass, which is pounded into a fine powder, and mixed in several large conches of caxiri. This is drunk by the assembled company" (Wallace, 'Travels on the Amazon,' p. 498), under the full belief that the virtues of the deceased will thus be transmitted to the drinkers. The Cobeus

contain human bones which belonged to individuals of various ages and of both sexes; closely packed, without order or arrangement. In the Åsagrafven, in Scania, a vast quantity of human bones were found, divided into two layers by a bed of sand of about six inches in thickness. In a "gallery-tomb," at Hammer, in the south-eastern part of the island of Zeeland (Denmark), examined in the year 1863, a quantity of human bones were found lying in several layers, without any order or arrangement; they appeared to have been thrown in after having been divested of the flesh. In the same year, a "gallery-tomb," near Luttra, West Göthland, was opened; after removing a layer of black loam about four feet in thickness, a great quantity of human bones were found, packed together indiscriminately, in the greatest confusion.*

The Andaman islanders bury their dead in a sitting posture, When the flesh is supposed to be entirely decayed, the skeleton is dug up, but instead of consigning the bones to an "ossuary," each of the relatives appropriates a bone. In the case of a married man, the widow takes the skull and wears it suspended by a cord round her neck.†

In the Society Islands the bodies of the deceased were not buried immediately after death, but were placed upon a platform

also drink the ashes of the dead in the same manner.—'Prehistoric Times,' p. 455.

The Rev. E. L. Barnwell informs me that, according to a Breton custom, the bones of the dead were exhumed when sufficient time had elapsed for the flesh to perish; the skull was enclosed in a little hutch, somewhat like a small dog's house, and this was placed in the church, or church porch, with the legend, "Ci git le chef de Jean . . . ." whatever the name may be. The other bones were placed in *ossuaries*, or reburied. This curious practice only applied to the skulls of men; those of women were not thus honoured.

See also Weld, 'Vacation in Britany,' 1856, p. 119. Miss B. R. Parkes, in 'Gent. Mag.,' October, 1867, N.S., vol. iv., p. 485. The same practice also obtains in certain parts of sub-alpine Italy.—Rev. S. W. King, 'Pennine Alps,' 1858, p. 471. Dr. Thurman mentions that he has witnessed a similar practice in the Roman Catholic cantons of Switzerland, where an *ossuary* is found in many, perhaps most, of the churchyards. Here are immense piles of bones, with hundreds of skulls on shelves, many of them labelled with the names of the dead, and date of birth and death.—Thurnam, 'Anc. Brit. Barrows,' 'Archæologia,' 1869. In the Society Islands the skull is not always buried with the other bones when divested of the flesh, but is deposited in a kind of box.—'Prehistoric Times,' p. 384.

* See Nilsson, 'Stone Age of Scandinavia' pp. 160—168.

† Mouatt, 'Adventures and Researches among the Andaman Islanders,' p. 327. 'Prehistoric Times,' p. 346.

railed in with bamboo. When the flesh had entirely perished, the bones were collected, carefully cleaned and buried, according to the rank of the deceased, either within or without a "morai"—a pyramidal stone structure, not very unlike a gigantic long barrow.*

Among the New Zealanders the dead were wrapped in native cloth, and either buried in a contracted posture, or exposed for a while on small square platforms; when the flesh had decayed away, the bones were washed, and finally deposited in a small covered box, which was generally elevated on a column in or near the village.† In some districts, however, they were usually thrown into the sea. None of the objects used by the deceased during his last illness were ever employed again.‡ They were generally broken or buried with their late owner. In one instance a moa's egg was found in the hands of a dead Maori, who was buried as usual in a sitting posture. The egg was perfect,§ and may have been intended to serve as food for the dead.‖

The Rev. Canon Greenwell opened a tumulus, in March, 1864, about half a mile west of the Scamridge Dikes, North Riding of Yorkshire. In the central line of the barrow was a deposit of loose oolitic rubble, three feet six inches in width, running east and west for about forty feet. This deposit was three feet in height, and had above it two feet of earth and small stones, the bottom resting upon a thick stratum of forced clay, which again was laid upon the natural surface of the ground. Amongst this loose rubble were found the remains of about fourteen bodies, not laid in any order, but the broken bones scattered and lying in the most confused manner—half a jaw, for instance, resting upon a thigh-bone, and a fragment of a skull amongst the bones of a foot, whilst other portions of the same skull were found some feet apart. Nor was this disarrangement due to any subsequent disturbance of the barrow; on the contrary, there were most certain indications that the bones had been so deposited originally. From the broken and dislocated state in which they were found—no two in their relative positions—

* Cook's 'Voyages,' vol. iii., p. 166; vol. ii., p. 6. 'Prehistoric Times,' p. 384.

† Dieffenbach, 'New Zealand,' p. 63. Fitzroy, 'Voyage of the Adventure and Beagle,' p. 579.

‡ D'Urville, vol. ii., p. 536.

§ 'Zoologist,' Feb., 1865, p. 9454.

‖ 'Prehistoric Times,' p. 369.

there can be little doubt that before they were entombed the flesh must have been removed.*

Canon Greenwell adds:—"It appears to me that, in these broken skulls and disjointed bones, we have the result of feasts at the interment, where slaves, captives, or others, were slain and eaten."†

On the other hand, the Rev. W. C. Lukis thinks that the custom of removing the flesh before burial may have been practised in Yorkshire. "Had there been any evidence, historical or archæological, of early British cannibalism—of which there is none, or next to none, at present—we might have concluded that these collections of bones, burnt and unburnt, were all that remained after such feasts."‡

The question, therefore, is, are these deposits of human bones to be regarded as evidence of cannibalism, or are they merely ossuaries? The present writer is strongly impressed with the idea that some of these deposits *are* ossuaries, whilst others are probably remains of the funeral feast.

About twenty-four skeletons were found in a tumulus, opened by Canon Greenwell, in 1867, at Burrow, on the Yorkshire Wolds. These skeletons had been divested of the flesh before they were placed in the tumulus; for the bones, although placed in position, were in many cases wrong end first. Some of the bones of the skeletons were missing. This had not happened from their having decayed, but from their not having been put there when the body was replaced. It is not very easy to account for this disturbance of the remains. Probably Canon Greenwell is correct in supposing that the displacement was due to the secondary interments which have taken place in the mound. All the remains had a great deal of charcoal around them, and were laid upon the natural surface or upon a pavement, which consisted of flat pieces of chalk, laid in a direction from N.W. to S.E., for nine feet six inches, with a breadth of three feet six inches. Canon Greenwell says:—"The number of interments in this mound (Burrow) was very great, and the disturbed condition of nearly the whole of them is very remarkable. Indeed, it is difficult to

* 'Ancient Grave-hills in the North Riding of Yorkshire,' in 'Archæological Journal,' vol. xxii., pp. 103, 104. I am greatly indebted to Canon Greenwell for the loan of his MS. notes of the examination of some of the Yorkshire tumuli, from which I have largely quoted.—E. T. S.

† 'Archæological Journal,' *l.c.*, p. 107.

‡ 'Yorkshire Archæological Journal,' 1869, part ii., p. 123.

say to the introduction of which body or bodies the disturbance was due, for all the skeletons appear to have been more or less moved and replaced. There seemed no reason to suppose that this had been caused by any opening made, from curiosity or other motive, in modern times. Indeed, the whole of the barrow showed unmistakable evidence that many centuries must have elapsed since the earth of which it was formed had been moved. Nor is it likely that if the barrow had been opened for other purposes than to bury in it, that the bodies which were disturbed by the opening would have been relaid with regard to the order of the bones. The mound seems to have been in use as a burying-place for some time, and it would appear that it had been opened, at various places and probably more than once, to introduce fresh interments, though which those were it is not very easy to say."* At all events too much care had been bestowed upon the burial of these skeletons to allow us to believe that they merely represent the bones left after a cannibal feast. Although the skeletons were laid in nearly every possible position, they were so placed that they formed a line, running south-east by north-west, and the rude chalk flooring, which has been mentioned, existed under the greater part of the remains.†

Should we be tempted to feel surprise that the body was not buried immediately, or soon after death, we must bear in mind that some modern savages believe that the spirit lingers around the body it has quitted, perhaps to revisit it. To facilitate this a slight opening was left in the grave, through which it might enter. "To this day," says Mr. Morgan, "among a portion of the Iroquois, after the body has been deposited in a coffin, holes are bored through it for this purpose."‡ It was not until some time after its separation from the body that the spirit was supposed to finally depart from the neighbourhood.

The Iroquois believed that it was a journey from earth to heaven of many days' duration. Originally it was supposed to be a year, and the period of mourning for the departed lasted for that period. In modern times the mourning period has

* Canon Greenwell mentions, in a letter with which he has favoured me, that he has met with many instances of disturbance by secondary interments; in one case half a skeleton only was found, the other half having been broken up, the bones being scattered amongst the soil used in filling in the secondary cutting.—E. T. S.

† C. Monkman, 'Malton Messenger,' May 18, 1867.

‡ 'League of the Iroquois,' p. 176.

been reduced to ten days, and the journey of the spirit is now believed to be performed in three days. A custom prevailed in ancient times of capturing a bird, and freeing it over the grave on the evening of the burial, in order that it might bear away the spirit of the dead,* which was supposed to be hovering around the body. The Iroquois also believed that the spirit, during the journey, required the same nourishment as while it dwelt in the body. They, therefore, deposited food near the corpse, and a fire was made near the spot at night, so that the spirit might be enabled to cook its food. Unless the rites of burial were performed, it was believed that the spirits of the dead wandered about upon the earth in a state of great unhappiness. Hence the extreme solicitude of the Indian tribes to procure the bodies of their slain in battle.† When such feelings as these existed, we can quite understand that the burial of a body immediately after death beneath a tumulus would have been most repugnant to the feelings of the surviving friends. But when the spirit had taken its final departure, then, and not before, would they collect together the bones and bury them.‡

Stone Heaps.

Small heaps of stones are frequently met with upon the hills in North America. They usually contain about two cart-loads of material, and almost invariably cover a skeleton. Rude implements are sometimes found with the skeleton. A number of such interments have been observed near Sinking Springs,

* The Esquimaux, until quite recently, were accustomed to place a dog's head by the grave of a child, that the soul of the dog, which always finds its way home, might show the helpless child the road to the land of souls. Cranz, 'Hist. of Greenland,' quoted in Nilsson's 'Stone Age of Scandinavia,' p. 140. The ancient Mexicans also sacrificed a native dog to guide the soul of the departed over the river of death. See Tylor in 'Trans. International Congress Prehistoric Archæology,' 1868. p. 22.

† 'League of the Iroquois,' pp. 174, 175.

‡ This subject requires for its discussion far more space than is at my disposal, and far more knowledge than I possess The same remarks apply to the matter in the pages devoted to a general consideration of the "Tumuli of the Old World," and I must ask the indulgence of those who have studied these subjects longer and more deeply than I have. Should my remarks induce others to write more fully on these topics, my sketch will not have been penned in vain.—E. T. S.

Highland county, Ohio; also in Adams county, in the same State, and in Greenup county, in Kentucky.

Heaps of similar character are found in the Atlantic States, where they were raised by the Indians over the bodies of those who met their death by accident. Dwight mentions a heap of stones of this description which was raised over the body of a warrior killed by accident, on the old Indian trail between Hartford and Farmington, in Connecticut. Traces of a similar heap still exist on the old trail between Schenectady and Cherry Valley in New York, with which a like tradition is connected. They were not raised at once, but were the accumulations of a long period, it being the custom for each warrior as he passed to add a stone to the pile. Hence the general occurrence of these rude monuments near some frequented trail or path.*

Professor Nilsson has mentioned that "those who have travelled in the south of Sweden have no doubt often observed a mound of stones piled up, and near it a wooden cross, having an inscription informing the traveller that such or such a person has perished by some accident near the spot. I remember well how astonished I was in my childhood when I saw old men amongst the peasantry who did not dare to walk or to ride past such places until they had found a stone to throw upon the heap. If no stone could be found, they took pieces of wood, branches of trees, or twigs of bushes, to throw upon it, since it was held to be a sacred duty that the cairn should be in some way increased." †

The Scotch Highlanders have still a complimentary proverb, "Curri mi clach er do cuirn," *i.e.*, "I will add a stone to your cairn." ‡

Captain Cook saw a cairn at Oonalashka, and he observed that every one who passed threw a stone on it. § The Greenland Esquimaux bury some of their dead in a sitting posture, and make a heap of stones over the grave. ‖

Among the Feegeeans the graves of the common people are only marked by a few stones, but over those of chiefs they build small houses, from two to six feet in height; or, in some in-

* 'Anc. Mon. Miss. Valley,' pp. 184, 185.

† 'Stone Age of Scandinavia,' p. 214, *note.*

‡ Wilson, 'Prehistoric Annals of Scotland,' vol. i., p. 86.

§ 'Voyage to the Pacific Ocean,' vol. ii., p. 521.

‖ 'Prehistoric Times,' p. 409.

stances, erect large cairns of stone; these, also, are sometimes "set up to mark the spot where a man has died."* The body is buried in a sitting posture.

In all these instances the cairn was erected as a memorial, and more or less with the view of showing respect for the dead. Diodorus, however, writing of the Troglodytes near the Red Sea, tells us that "they mock at all manner of sepultures, for as soon as any of them is dead, they tie his head betweene his legs with a withe of hawthorne or willow, and dragging the corpse to the highest place they can finde with laughter and jeering, they overwhelme it with stones, and then putting a goat's horn on the top of the stones, they leave it there without any pitty or compassion at all."†

We learn from the same writer that the people of the Balearic Isles pounded or mashed the body of the deceased with wooden clubs, and so forced it into some sort of trough or receptacle, after which they raised over it a great pile of stones.‡

* Williams, 'Figi and the Figians,' vol. i., p. 192. 'Prehistoric Times,' p. 360.

† Diod. Sic., book iv., c. 15. 'Done into English by H. C. Gent,' 1653.

‡ Diod. Sic., book vi., c. 5.

TUMULI OF THE OLD WORLD.

We are not entirely without accounts of the ceremonies which accompanied the erection of tumuli in the Old World, and the analogy between the practices adopted in both hemispheres is too striking to be allowed to pass entirely unnoticed. The custom of erecting high mounds of earth over the remains of persons of distinction appears to have been common to all the branches of the great Indo-Germanic family from times long pre-historic till considerably later than the Roman period.* Of course, in considering the general question of tumuli, we must not think only of those of Celtic or Scandinavian construction, or view even these as the rude contrivances of a barbarous or half-savage people, but we must regard them as parts of one great sepulchral system of the ancient world, and common to nations of both a high and a low development.

Achan and his whole family were stoned with stones and burned with fire; after which we are told that Israel "raised over him a great heap of stones unto this day. So the Lord turned from the fierceness of his anger." Again, the King of Ai was buried under a great heap of stones.

According to Diodorus, Semiramis, the widow of Ninus, buried her husband within the precincts of the palace, and raised over him a great mound of earth.

* The Rev. J. Earle informs me that the erection of tumuli and the burning of the dead prevailed more or less in Europe until the time of Charlemagne, by whom such practices were made criminal. See Louis de Baecker, 'Religion du Nord de la France avant le Christianisme,' p. 225. His reference is 'Capitul. de Part. Saxon,' c. 7.—E. T. S.

The mound supposed by Xenophon to contain the remains of Alyattes, father of Crœsus, King of Lydia, was of stone and earth, and more than a quarter of a league in circumference. In later times Alexander the Great caused a tumulus to be heaped over his friend Hephæstion, at the cost of 1200 talents; no mean sum even for a conqueror like Alexander, for it was equivalent to £232,500 sterling.*

It is, perhaps, a fair testimony to the antiquity of the Homeric poems, that no other mode of sepulture but the tumulus seems to have then been in vogue.

There are three terms by which Homer mentions tumuli, viz., σήματα, or "marks;" τύμβοι, a word perhaps etymologically connected with "tumulus"; and ἠρία. The last word Mr. Paley† connects with the old words, ἥρ, Fήρ, ἀρετή, and the Latin *vir*, closely allied to our words *war* and *warrior*; and he thinks that ἠρίον (Fηρίον) thus meant "a man-place." Later, but yet early, Greek writers call tumuli χώματα, τάφοι, or χωστοὶ τάφοι; and these are the terms generally used by Pindar, the tragic writers, and Herodotus. Homer never uses τάφος of the actual tomb. Though he does not employ χῶμα and χῶσαι, he has the corresponding expressions, χεῖν σῆμα, or τύμβον, τυμβοχοῆσαι, and χυτὴ γαῖα, "poured or hand-spread earth." For the earth was brought by hand, probably in baskets, and poured upon the body or the burnt remains of it—in fact, on the site of the funeral pyre—till it had attained a considerable height.

This feature has been particularly noticed by Squier and Davis in the American tumuli. In describing the section of Mound No. 1, "Mound City," they say—

1st. Occurred a layer of coarse gravel and pebbles, &c.

2nd. Beneath this layer of gravel and pebbles, to the depth of two feet, the earth was homogeneous, *though slightly mottled, as if taken up and deposited in small loads*, from different localities.

Three other similar bands of earth are mentioned as having been noticed in the section, and an engraving representing their mottled appearance is given.‡

* Bateman, 'Ten Years' Diggings in the Celtic and Saxon Gravehills,' Preface, p. v., quoted in 'Prehistoric Times,' pp. 86, 87.

† The remarks 'On Homeric Tumuli' are abridged from a paper read by F. A. Paley, M.A., March 12, 1866, before the Cambridge Philosophical Society. See 'Trans.,' vol. xi., part 2.

‡ 'Anc. Mon. Miss. Valley,' p. 144, fig. 30.

The Homeric passages which contain the most detailed accounts of the raising of tumuli and the accompanying rites of sepulture are the twenty-fourth book of the Iliad, line 782 to the end; the twenty-third book, from line 110 to 257; and the twenty-fourth of the Odyssey, line 65 to 84. It may be deduced, with great clearness and certainty, from these accounts, that there were four principal operations attending the burial of a person of importance, viz., washing and dressing the body, burning it on the pile, collecting the ashes in a cinerary urn, and raising a tumulus over the spot.

In the twenty-fourth book of the Iliad the following facts are stated with respect to the burial of Hector:—

1. For nine days wood for the pyre was collected in carts, to which oxen and mules were yoked (782—4).
2. The body was laid on the top of the pyre, which continued burning for twenty-four hours.
3. The part of the pyre which had been ignited and was still smouldering was completely extinguished by pouring wine on it.
4. The white and calcined bones, λευκὰ ὀστέα, were carefully picked out of the ashes by the friends and companions of the deceased (793).
5. These bones were placed in a metallic urn.
6. The urn was deposited in a hollow grave, doubtless a kist-vaen of masonry, and covered over with well-fitted large stones, πυκνοῖσιν λάεσσι κατεστόρεσαν μεγάλοισι.
7. A barrow was with all speed (ῥίμφα)* erected over the grave; after which the friends returned home and partook of a funeral banquet.

In America, it appears that earth was heaped over the fire while it was still burning,† a more rough and ready proceeding

* I am indebted to my brother, Rev. T. Stevens, for the following suggestions:—"ῥίμφα is closely allied to ῥίπτω, and some action akin to that of throwing is generally implied where it is used. I incline to the belief that ῥίμφα might be here translated 'by throwing,' with a secondary sense of haste, 'hastily throwing.' Such a rendering would fit in with the description of the process, be more Homeric in point of vividness, and something better than a mere repetition of the idea in αἶψα two lines above. Should this meaning be tenable it would give freshness and vigour to a word that would be tame if it conveyed the bare idea of 'haste.'"—E. T. S.

† See pages 369, 370.

than the Greek mode of extinguishing it by pouring wine upon the embers.

In the Odyssey, bk. xxiv., the following circumstances are described as having taken place at the funeral of Achilles :—

1. The lamentation over the dead body was continued for seventeen days and nights.
2. Numerous fat sheep and oxen were slaughtered at the pile.
3. The body was burnt in a *peplus* or embroidered robe, amidst (that is, with) jars of sweet unguent and honey.
4. A war-dance was performed round the burning pyre.
5. The bones of the deceased were collected from the ashes of the pyre, laid in sweet unguent and wine, and deposited in a gilt or golden urn.
6. In the same urn with the bones of Achilles were placed those of his dearest friend, Patroclus ; but in a separate urn those of his next dearest friend, Antilochus, the son of Nestor.
7. Round or upon these urns a great and beautiful, or symmetrical (ἀμύμων)* tumulus was raised.
8. This stood on a conspicuous headland, expressly that it might be seen from afar, by living and by future generations of men.

Mr. Paley says :—" I wish I had time to discuss the question, whether barrows were not, as rock-tombs certainly were, used as altars. I incline to the belief that they were." Mr. Paley, however, does not mean that " altars," resembling those in some of the American mounds, existed *in* these tumuli, but that the mound itself was regarded as an altar, and that libations and blood-offerings were poured upon it as upon an altar.†

* The precise meaning of this word is " faultless," and it may apply either to the symmetry of the mound, or to its faultless construction in *all* particulars.

† The spirits of departed chieftains were worshipped and propitiated with living victims, αἱμακουρίαι (" blood-gluttings ") or ἐναγισμοὶ, annually sacrificed at their graves. We can only comprehend the nature and principles of hero-

Funeral pyres were sometimes of immense size; that constructed for Patroclus is expressly said to have been a square of a hundred feet.

> "They, still abiding, heap'd the pile.
> An hundred feet of breadth from side to side
> They gave to it, and on the summit placed
> With sorrowing hearts the body of the dead."

The tumulus was ordered to be raised only to a small height at first, and was to be made broad and high,* εὐρύν θ' ὑψηλόν τε (Il. xxiii.), afterwards. The precise method of making the tumulus, or what we must rather call the nucleus of it, is described, and in the following way.

They first drew an outline or plan of the tomb.† This being made, they next laid θεμείλια, or foundation stones, round the outline, so as to inclose the pyre. Thirdly, they heaped loose

worship by realising the purely materialistic ideas of the Greeks, and probably of the early world generally, about the state of the dead. They were believed to retain a feeble semi-animate existence in the other world; they were regarded as beings—not, indeed, destitute of all sense and consciousness, but as having it in an inferior degree. Death was not so much an extinction as a negation of the pleasures and energies of life—a doleful existence, dark and drear, and rendered more or less tolerable by the regard or neglect of the friends on earth. Of the sensations of hunger and cold the spirits were fully capable, and to feed and clothe the disconsolate ghost was the best and readiest way of securing its favour. As with the Jews, so with the Greeks, the vital principle was supposed to reside in the blood. Hence, to glut the ghost with blood was to restore to it for the time strength and animation. The blood was supposed to be conveyed, through the kindly agency of earth, to the far-distant spirit in the regions beneath.—F. A. Paley, 'On Chthonian Worship,' 'Journ. Philology,' 1868, vol. i., No. 1, pp. 4, 5.

* There was a particular reason for heaping the tumulus over Patroclus to a slight height at first. This was done in order that the ashes of Achilles might be placed in the same mound at a future period.

† τορνώσαντο δὲ σῆμα. "Now, as τόρνος means a lathe, we should naturally say that this meant a circular plan. But I believe it means an *oval* plan, and for these reasons. First, the only other passage in Homer where this verb τορνώσασθαι is used, is in Od. v. 249, where it refers to the shape of a barge or vessel for carrying goods, vessels of war being called θοαὶ or μακραὶ, pointed or long ships. No one can conceive a *really* circular ship (στρογγύλη ναῦς); and it is clear that Homer means oval, because he applies the epithet *wide* to it, φορτίδος εὐρείης, a term that could not well be applied to a circle."—Paley, *l.c.*, pp 8, 9.

earth, χυτὴ γαῖα, upon them. This earth, as previously mentioned, was probably brought in small quantities at a time, say in baskets or folded garments, and thrown upon the burnt wood and ashes of the pyre. Herodotus mentions, i., 93, that the tomb of Halyattes, father of Crœsus King of Lydia, was a barrow, χῶμα γῆς, of which the foundation, κρηπίς, was of large stones. Sir W. Gell, in his illustrated work on the Topography of the Troad, describes, and gives a good sketch of a remarkable and indeed unique tumulus on the hill of the present Bounarbashi, the site of the ancient city of Troy. This is entirely composed of a huge heap of stones, with some faint traces of earth having been thrown over them.*

Herodotus has left us a remarkable description of the mode of interment of the dead which prevailed among the ancient Scythians, whose barrows still cover the plains of southern Siberia; immense cones of earth, sometimes between two and three hundred feet in height. The historian tells us that, on the death of a chief, they embalmed the corpse and carried it to the district of the Gerrhi. Here the body was placed upon a couch in a quadrangular chamber sunk in the earth, encompassed on all sides with spears fixed in the ground; these they covered with timber, and after depositing all things considered to be needful for the comfort of the dead chieftain in the other world,† they filled up the chamber with earth, and raised a tumulus further over the spot as high as possible.‡

With the dead chief they buried one of his wives, whom they previously strangled, together with certain of his servants, his horses, the choicest of his effects, and, finally, some golden goblets. In the following year they selected fifty of the deceased chief's attendants, and strangled them, with an equal number of horses. The bodies were disembowelled, cleansed,

* Tumuli were raised, and funeral offerings brought, even when the body was absent, and the hero had perished in unknown lands. This is apparent from Od. i., 291, where Pallas Athene instructs Telemachus, if he should have ascertained that his father was really dead, to return home, σῆμά τέ οἱ χεῦαι, καὶ ἐπὶ κτέρεα κτερεΐξαι.—Paley, *l.c.*, p. 11.

† It is amusing enough to contrast the objects supposed to be needed to secure the comfort of the dead. According to Weinhold ('Altnordisches Leben,' p. 493), the tobacco-pipe, pocket-knife, and filled brandy-flask were placed in Swedish graves (it is to be supposed only in remote districts), if not up to the present time, at all events up to the beginning of the present generation. Dr. Rolleston, 'Excavations at Frilford,' 'Archæologia,' 1870, p. 9, *note.*

‡ Herodotus, iv., lxxi.

stuffed with straw, and then sewn up again. The stuffed horses were placed upon wooden scaffolds; they were bridled, and one of the strangled servants was mounted upon the back of each.*

When a chief died among the Feegeans, it was usual to "send with him" some of his women and some slaves. At the death of Ngavindi, Mr. Calvert went to Mbau, hoping "to prevent the strangling of women, but was too late. Three had been murdered. Thakombau proposed to strangle his sister, the chief wife of the deceased, as was the usual custom; but the Lasakau people begged that she might be spared, and that her child might become their chief. Ngavindi's mother offered herself as a substitute, and was strangled. The dead chief lay in state, with a dead wife by his side, on a raised platform; the corpse of his mother on a bier at his feet, and a murdered servant on a mat in the midst of the house. A large grave was dug in the foundation of a house near by, in which the servant was laid first, and upon her the other three corpses, wrapped and wound up together."† It seems that the body or bodies of the murdered servants were "called 'grass' for bedding the grave."‡

Several of the Scythian burial-mounds have been opened at different periods, and a description of the examination of one of them is given by Mr. Deane in the second volume of the "Archæologia": — "After removing a very deep covering of earth and stones, the workmen came to three vaults, constructed of unhewn stones of rude workmanship. That wherein the corpse of the Khan was deposited was in the middle, and the largest of the three. In it were laid by the side of the corpse a sword, spear, bow, quiver, and arrows. In a vault at his feet lay the skeleton of his horse, with a bridle, saddle, and stirrups.§ In a vault at his head was laid a female skeleton, supposed to be that of the wife of the chief. The body of the male corpse lay reclining against the head of the vault, upon a sheet

* Herodotus, iv., lxxi., lxxii.

† Williams, 'Fiji and the Fijians,' 1858, vol. ii., p. 301.

‡ Ibid., vol. i., p. 189, 196. 'Prehistoric Times,' p. 115. Even in the mild and polished country of China, the Emperor Chun-Tchi, having lost one of his wives, sacrificed more than thirty slaves upon her tomb.

§ For the burial of the horse in Teutonic graves, see Wylie, 'Grave of the Alemanni,' 'Archæologia,' vol. xxxvi. For the suspension of the skull of the horse over graves, see 'Pagan Saxondom,' p. 23; see also, 'Prehistoric Times,' p. 115.

of pure gold, extending the whole length, from head to foot; another sheet of gold, of the like dimensions, lay over the body, which was wrapped in a rich mantle, bordered with gold, and studded with rubies and emeralds. The head was naked, and without any ornament, as were the neck, breast, and arms. The female corpse lay reclining against the wall of the vault, resting upon one sheet of gold and covered with another. A golden chain of many links, set with rubies, was around her neck, and on her arms were bracelets of gold. The body was covered with a rich robe, but without any border of gold or jewels. The vestments of both these bodies looked, at the first opening, fair and complete; but, upon the touch, crumbled into dust. The four sheets of gold weighed forty pounds."

Burial among the Patagonians is attended with ceremonies somewhat like those practised by the ancient Scythians. The flesh having been stripped from the bones, they are hung "on high, upon cane or twigs woven together, to dry and whiten with the sun and rain." One of the most distinguished women is chosen to perform the disgusting office of making the skeleton, and during the process "the Indians, covered with long mantles of skins, and their faces blackened with soot, walk round the tent, with long poles or lances in their hands, singing in a mournful tone of voice and striking the ground, to frighten away the Valichus or evil beings. . . . . The horses of the dead are killed, that he may have wherewithal to ride upon in the Alhue Mapu, or Country of the Dead." In about a year the bones are "packed together in a hide, and placed upon one of the deceased's favourite horses, kept alive for that purpose," and in this manner the natives bear the relics, sometimes to a very great distance, until they arrive at the proper burial place, where the ancestors of the dead man are lying. The bones are arranged in their proper positions, and fastened by string. The skeleton is then placed, with others, in a square pit, clothed in the best robes, and adorned with beads, feathers, &c. The arms of the deceased are buried with him, and round the grave are ranged several dead horses, raised on their feet, and supported with sticks.* Sometimes a cairn of stones is raised over the grave.†

That tumuli were intended to perpetuate the memory of the

* Falkner, 'Patagonia,' pp. 118, 119.

† Fitzroy, vol. ii., p. 158. See 'Prehistoric Times,' p. 431.

illustrious dead seems to be proved by the dying request of Beowulf:—

"fremmaȝ ge nū	"perform ye now
leōda þearfe:	*the* people's need:
ne mæg ic her leng wesan;	I may here no longer be;
hātaȝ heaȝo-mǣre	command *the* warlike brave
hlǣw gewyrcean	*a* mound to make
beorhtne æfter bǣle,	bright after *the* pile,
æt brimes nosan,	at *the* sea's naze
se sceal tō gemyndum	which shall for *a* remembrance
mīnum leōdum	to my people
heāh hlifian	tower on high
on Hrones-næsse;	on Hrones-næs;
þæt hit sǣ-liȝend	that it sea-farers
syȝȝan hātan	afterwards may call
Biowulfes biorh."	Beowulf's mount."*

In another part of the same poem we have a detailed account of the funeral ceremony:—

"Him ȝā gegiredon	"For him then prepar'd
Geāta leōde	*the* Goths' people
ād on eorȝan	*a* pile on *the* earth,
unwāclīcne,	*a* mighty *one*,
helm-behongen,	with helmets hung,
hilde-bordum,	war-boards,
beorhtum byrnum,	bright byrnies,
swā he bēna wæs.	as he had requested.
Alegdon ȝā tō-middes	Laid then in the midst
mǣrne þeōden	*the* great prince
hæleȝ hiōfende,	*the* warriors lamenting,
hlāford leōfne:	*their* beloved lord:
ongunnon þa on beorge	began then on *the* mount,
bǣl-fȳra mæst	of bale-fires *the* greatest
wīgend weccan:	*the* warriors to kindle:
wudu-rēc astāh	*the* wood-reek ascended
sweart of Swīo-ȝole,	swart from *the* Swedish pine
swōgende leg,	the roaring flame,
wōpe bewunden,	with weeping mingled,
* * *	* * *

* 'Beowulf,' Thorpe's translation, xxxviii., 5593—5606.

heofon rēce swealg.	heaven swelled with smoke.
Geworhton ðā	Wrought then
Wedra leōde	*the* Weders' people
hlǣw on hliðe;	*a* mound on *the* hill;
se wæs heāh and brād,	it was high and broad,
wǣg līðendum	by wave-farers
wīde tō-sȳne;	widely to be seen;
and betimbredon	and constructed
on tyn dagum	in ten days
beadu-rōfes beācn.	*the* renown'd warrior's beacon.
* * *	* * *
þā ymbe hlǣw ridon	Then round *the* mound rode
hilde deōr * *	war-beasts * *
æðeling * *	nobles * *
* * *	* * *
cyning mǣnan.	*their* king bewail."*

It is extremely probable that the tumuli of Ohio, examined by Squier and Davis, were not all erected at the same period, or even by the same race of men, and more careful examination of the American mounds may yet yield results of great archæological interest and value. Instead of merely classing the tumuli as "altar" mounds, mounds of sepulture, temple mounds, and so on, we may be able to connect the erection of each or some of these classes with special tribes, or with a change in the habits of some particular tribe. Without attempting to enter into the general question, it may be well to mention what has been accomplished in this particular direction by Dr. Thurnam, with reference to the tumuli of Wiltshire and some of the adjoining counties. Tested by their outward form and by their contents, says Dr. Thurnam,† they are divisible into two great classes; viz.: *long barrows* and *round barrows*, of which the first named are the earliest in time.‡

* 'Beowulf, 6265—6324.

† 'On the Ancient British Barrows of Wiltshire, &c.' A paper read at the opening of the Blackmore Museum, 1867.

‡ Dr. Thurnam has proposed the following sub-division of these two classes in his paper upon 'Anc. Brit. Barrows,' published in the 'Archæologia,' 1869:—

I. Long Barrows (Stone Period).

1. Simple or Unchambered Long Barrows.
2. Chambered Long Barrows.

The *long barrows*, in accordance with the geological character of the districts in which they occur, are either simple tumuli of earth, chalk rubble, and flints, as in South Wilts and Dorsetshire; or they contain more or less elaborately built-up chambers, galleries, or cists of large stones, as in North Wilts and Gloucestershire. Whether, however, they enclose megalithic chambers or not, the sepulchral deposits are almost invariably found at or near the broad and high end of the tumulus, which is generally directed towards the east. But, what is most important, in no case whatever have the primary interments yielded objects of metal, whether bronze or iron; though in several instances implements and weapons of bone and stone have been found with them. Among the latter are specially to be noticed certain delicate, well chipped, arrow-heads of flint, of a leaf-shape; and probably, as at Uley, axe-heads of flint and greenstone, both polished. Dr. Thurnam, therefore, regards this form of tumulus, as it occurs in the south-west of England, as belonging to the Neolithic age, and to a period when the burning of the dead, though not unknown, was not a generally received or favoured method of disposing of their remains.

The *round barrows*, whether simply conoïd or bowl-shaped, or of the more elaborate bell or disc forms, are very much more numerous than the long barrows of the same district. They much more frequently cover interments after cremation than by simple inhumation; in the proportion of at least three of the former to one of the latter. As, however, the objects found with the burnt bones, and with the entire skeletons in this class of barrows, do not differ in character, but in addition to implements and weapons of stone, including beautifully barbed arrow-heads of flint, not unfrequently comprise other imple-

II. Round Barrows (Bronze Period).

1. Bowl-shaped Barrows	α. Simple bowl-barrows. β. Trenched ,, ,, γ. Composite bowl or oval barrows.
2. Bell-shaped Barrows	α. Simple bell. β. Twin. γ. Triple.
3. Disc-shaped Barrows	α. Simple, with flat area. β. With one, two or three small central tumuli. γ. With one low mound nearly covering the area.

ments of *bronze*, and also the finer and more decorated sorts of ancient British *fictilia* — the so-called "drinking cups" and "incense cups"—Dr. Thurnam concludes that all are of the same *Bronze period*, during which, in this part of Britain, cremation, though not the exclusive, was the prevailing mode of interment.

The great interest of Dr. Thurnam's discoveries, however, centres around the peculiarities in the human remains found in these two classes of tumuli, and the inferences which he has deduced from them; these are given in the following summary:—

"I. The skulls from the primary interments in the *long barrows* of Wiltshire and Gloucestershire, and it is believed of south Britain in general, are of a strongly marked dolichocephalic type, having a mean breadth-index of ·71; which is much lower than that of any modern European people.* No

* The skulls derived from the chambered long barrows of North Wiltshire and Gloucestershire correspond in their general form with those from the unchambered long barrows. Though, on the average, not quite so long or narrow, they are very remarkable for their dolichocephalic and stenocephalic type. According to the tables published by Dr. Thurnam, the twenty-seven skulls from unchambered long barrows in South Wilts have a mean breadth-index so very low as ·69, whilst the forty skulls from chambered long barrows of the northern district have the somewhat higher breadth-index of ·71[5]. "An average length of skull, however, which is represented by a figure for the breadth-index so low as ·71[5] cannot be regarded as other than very remarkable. It is decidely lower than that observed in any people of modern Europe."—Thurnam, 'Anc. Brit. Barrows,' 'Archæologia,' 1869. See also Dr. Thurnam in 'Crania Britannica,' *passim:* 'Archæologia,' vol. xxxviii., p. 405; 'Memoirs of the Anthropological Soc.,' vol. i., pp. 120, 459. The long barrows of Derbyshire and Staffordshire have also produced dolichocephalic skulls. See Bateman's 'Vestiges,' pp. 46, 47, 91, 103; 'Ten Years' Diggings,' pp. 94, 144. Canon Greenwell says of the skulls found in the long barrows of Yorkshire:—"The type of skull found in the long barrows is a very marked one: they are eminently dolichocephalic. I believe no primary interment from a long barrow has produced a brachycephalic cranium." Dr. Thurnam has examined the skulls found in the primary interment in the long barrow at Scamridge, and considers them all to have been of a more or less dolichocephalous type. Two of the skulls have a breadth-index of ·71, and two are exaggeratedly dolichocephalous (·67, ·56). One of these last is that of a woman of about sixty years of age, with all the great sutures ossified and effaced. Dr. Thurnam says "it is the most narrow and elongated cranium I have ever examined; its scaphoid character being most extraordinary, considering that it is not an example of *scaphocephalus* proper, or congenital synostosis of the parietals. The sagittal suture is, however, exuberantly ossified in the interforaminal region, and the obliteration probably dates from the infantile period. The other skull is that

brachycephalic skull, with a breadth-index of ·80 or upwards, has been obtained from the primary interments in these barrows. No objects of metal or decorated pottery are known to have been found with these interments, but only those of stone, bone, or horn. We therefore refer these long barrows to the *Stone period.*

"II. The skulls from the primary interments in the *round barrows* of the same districts, and, it is believed, of South Britian in general, are of more or less brachycephalous proportions, having a mean breadth-index of ·81; much higher than that now found in the population of any part of England and Wales.* Objects of bronze, and very rarely of iron, and richly decorated pottery, are often found in them, with or without objects of stone. These round barrows, therefore, we refer to the *Bronze period*, and to that of *bronze and iron transition.*

"III. The skulls from secondary interments in the upper strata of the long barrows are in most cases of similar brachycephalous proportions with those from the primary interments in the round barrows. They have, in a few instances, been found in connection with decorated British pottery, altogether identical with that of the round barrows. They are doubtless the remains of the same people as those by whom the circular barrows were erected; and for all intents and purposes may be regarded as round-barrow skulls.

"IV. It has never been pretended that there is any necessary connection between long skulls and long barrows, or round skulls and round barrows; and the dolichocephalic people who in this part of England buried in long barrows, may have elsewhere erected circular tumuli over their dead.† The important

of a young man, about twenty years of age. All the sutures are open both within and without. It has the same narrow frontal as the skull last described, but without any trace of a central ridge. This skull is, moreover, of great interest, from the clear indication it affords of having been violently cleft at the time of death. The clefts affect the centre and left side of the frontal and the left parietal. Two, perhaps three, blows must have been inflicted on the head, probably by a blunt instrument, such as a club or a stone axe. One, on the frontal region, did not at first split the skull, but broke away part of the outer table, and produced a cracking and depression of the inner. I have abridged the above notice of the Scamridge skulls from the MS. kindly lent me by Canon Greenwell.—E. T. S.

* See Table by Dr. Beddoe. *Mem. Anthrop. Soc.* ii. 350.

† The Rev. W. C. Lukis informs me that long barrows are comparatively rare in Britanny, and seem to be more modern than the round barrows.—E.T.S.

question does not regard the form of their tombs, so much as the sequence of the two peoples in the order of time and civilisation. As to this, it is contended that the long heads were the true primæval race; and that they were succeeded by a taller, more powerful, and more civilised people, who gradually extended themselves, and became dominant through a great part, perhaps nearly the whole, of the island.

"V. These British *dolichocephali*, or long heads, are the earliest people whose sepulchral monuments can be shown to remain to us. The exploration of their tombs—the long barrows—shows that they buried their dead entire, and almost always without cremation;* that they possessed herds of small short-horned oxen—*Bos longifrons*, or *Bos brachyceros*—that they subsisted largely by the chase of the red deer and wild boar; that some of their customs were barbarous in the extreme; and in particular, that, if not addicted to anthropophagism, they at least sacrificed many human victims, whose cleft skulls and half-charred bones are found in their tombs.†

* Dr. Thurnam has recorded no more than three instances of the discovery of burnt human bones in the thirty-one long barrows examined in Wiltshire. These exceptional instances are at Knook, Tilshead, and "Bratton Castle." The cremation, however, seems to have been of an imperfect and defective sort, quite different from that of the round-barrow period; in which cremation was practised, in Wiltshire, in the proportion of rather more than three to one. 'Anc. Brit. Barrows,' 'Archæologia,' 1869.

† To Dr. Thurnam we are indebted for having established the connection between the long barrows and the dolichocephalic skulls, as also that the broken skulls from the long barrows are the result of purposely-inflicted violence. "In a large proportion of the long barrows which I have opened," says Dr. Thurnam, "many of the skulls exhumed have been found to be cleft, apparently by a blunt weapon, such as a club or a stone axe. Among the heaps of human remains I have sometimes found one skull unmutilated, whilst all the others show marks of cleavage. From a minute examination of the fractures, I think it evident that the violence was inflicted prior to burial, and in all probability during life. Such injuries might, no doubt, occasionally occur as an accident of war; but it is scarcely possible they should have thus occurred with a frequency so great as the careful examination of these remains discloses. I hence conclude that the skeletons with cleft skulls are those of human victims immolated on the occasion of the burial of a chief, whilst the unmutilated skeleton would probably be that of the person in whose honour the tumulus was erected—'Anc. Brit. Barrows,' 'Archæologia,' 1869. In the south-west of England cleft and broken skulls have been found in the long barrows of West Kennet, Littleton Drew, Uley, Tilshead, and Rodmarton.—Thurnam, 'Crania Brit,' plate lix. Dr. Thurnam has since found such cleft skulls in the long barrow on Fyfield Hill near Pewsey, Wilts. Alluding to his researches in the long barrows of Yorkshire, Canon Greenwell

"VI. The brachycephalous people, or round-heads, who buried in the round barrows, were more civilised than the *dolichocephali;* and it may be inferred that they brought with them the more common use, if not the first knowledge, of bronze. The exploration of their tombs shows that burning the dead was with them the prevailing, though not the exclusive, mode of burial; and the appearances are consistent with what we are told of the funerals of the Gauls (their supposed congeners), by Cæsar and Pomponius Mela. From the same source, or the appearances in their tombs, we should infer that they had advanced from the nomadic, hunting, and pastoral condition, to a more settled agricultural stage of culture; and that, if they had not altogether abandoned the more barbarous customs of their ancestors, and in particular that of human sacrifice (which all history tells us was, at one time, everywhere prevalent), they had at least restricted them within narrow limits.

"VII. There is no proof, nor is it the least probable, that the brachycephalic extirpated the earlier dolichocephalic people. It is far more likely that they reduced them to slavery, or drove them in part into the interior and western parts of the island. When once reduced to obedience, they may have lived with them on friendly terms, and even mingled with them in domestic relations. In some districts, the *brachycephali* would probably entirely replace the earlier race; whilst in others, the *dolichocephali* would live on under the supremacy of their more powerful neighbours. A mingling of the remains of the two peoples in their later tombs must almost certainly have ensued.

"VIII. The two races, whose existence is made known to us by researches in the tumuli, are most naturally identified with the two peoples, strongly contrasted in their manners, whom Cæsar describes in well-known passages of the twelfth and fourteenth chapters of the fifth book of his Commentaries.*

says:—"If they were the bodies of persons slain in battle we might, certainly, find the cleft skulls and the broken bones; but the accidents of war will not account for the scattered state in which the bones are found, or even for the bodies being, in many cases, those of women and children."

No trace of either anthropophagism or of human sacrifice has yet been found, according to the Rev. W. C. Lukis, in the tumuli of Britanny.

* "Britanniæ pars interior ab iis incolitur, quos natos in insula ipsa, memoria proditum dicunt. Maritima pars ab iis, qui prædæ ac belli inferendi causa ex Belgis transierant; qui omnes fere iis nominibus civitatum appel-

According to this, the round-heads of the Bronze period are the same as the agricultural people of the maritime districts, who are said by Cæsar to have migrated from Belgic Gaul; and the long-headed people of the Stone period are the ancestors of the pastoral and less civilised tribes of the interior, reputed aboriginal, and who, prior to the coming of the others—as to which event there is no certain note of time—must have occupied, and been dominant in the maritime parts, as well as in the interior of the island.

"IX. The origin and ethnic affinities of these two peoples can only be discussed conjecturally and tentatively, in the present state of science. An often-quoted passage in the 'Agricola' of Tacitus seems, however, to indicate part of the probable solution.* The great Roman historian points out, first, the dark complexion and curly hair of the western tribe of the Silures; and, secondly, the similarity of the appearance of the Southern Britons to their neighbours in Gaul. And he adduces the very obvious argument, from these differences of physiognomy and appearance, that the Silures were descended from the Iberians of Spain, whilst the southern and south-eastern Britons were derived from the people of the opposite coast of Gaul. As evidence of this last position, Tacitus refers to the similarity of the religion, language, moral and mental temperament of the Britons and Gauls. It is not improbable that in this passage the Silures are named κατ' ἐξοχήν, as a principal tribe, and as representatives of others not like themselves, confined to the extreme west of the island. By Cæsar, however, who knew nothing of the west of Britain, the Silures would be regarded as *interiores*, just as the regions producing tin were, and termed by him *mediterranei*. The *proximi Gallis* of Tacitus are clearly the same people as those of the *maritima pars* of Cæsar.

lantur, quibus orti ex civitatibus eo pervenerant, et bello illato ibi remanserunt atque agros colere cœperunt. . . . . Ex his omnibus longe sunt humanissimi, qui Cantium incolunt, quæ regio est maritima omnis, neque multum a Gallica differunt consuetudine. Interiores plerique frumenta non serunt, sed lacte et carne vivunt, pellibusque sunt vestiti." (*B. G.*, v., 12, 14.) Whilst it is seen that the Belgic tribes near the coast were comparatively civilised agriculturists, the people of the interior were much less cultivated, and still in the hunting and pastoral condition.

* Tac., 'Agric.,' xi. "Silurum colorati vultus, torti plerumque crines [Jornandes adds, 'et nigri,'] et posita contra Hispania, Iberos veteres trajecisse easque sedes occupasse, fidem faciunt. Proximi Gallis et similes sunt. . . . . In universum tamen æstimanti Gallos vicinum solum occupasse credibile est."

"X. The geographer Strabo is another important witness for a great difference in the features and personal characteristics of the Iberians and Gauls. In the course of his fourth book, he twice tells us that the Iberians differed entirely in their bodily conformation from the Gauls of both 'Celtica' and 'Belgica;' who, he expressly says, participated in the common Gaulish physiognomy.* It is evident that, if we interpret this observation of Strabo's by the light of that first quoted from Tacitus, we must picture the Iberians as a swarthy or *melanous* people, with dark complexion and curly dark hair. They would thus be strongly contrasted with the Gauls, who, by the classical writers, are uniformly represented as fair or *xanthous*, and, moreover, as of tall stature. Compared with the Gauls, the Iberians, like other southern Europeans, were probably a people of short stature. We derive no light from the remains in the barrows as to the colour of the hair and the complexion of the people buried in them; but they do enable us to ascertain a difference of stature. The measurement of the skeletons, and especially of the thigh-bones, from the long barrows and the round barrows respectively, clearly demonstrates that the *dolichocephali* of the former, as compared with the *brachycephali* of the latter, were a people of short stature. The mean height, as calculated from the measurement of fifty-two male skeletons or femora, was about 5ft. 6in. in the one and 5ft. 9in. in the other, the average difference being no less than 3in.

"XI. The cranial type of the ancient Iberians has not yet been so conclusively ascertained as is to be desired. But the examination of the large series of skulls of modern Spanish Basques, at Paris, as well as of such Spanish and Portuguese skulls as exist in English and Dutch collections, altogether justifies the presumption that the Iberians of antiquity were a decidedly dolichocephalous people.

"XII. The British *brachycephali* of the Bronze period are to be regarded as an offshoot, through the Belgic Gauls, from the great brachycephalous stock of central and north-eastern Europe and Asia; in all the countries of which—France, Switzerland, South Germany, Bohemia, Poland, Russia, and Finland—the broad and short cranial type is still the prevailing one.

"The earlier British *dolichocephali* of the Stone period were, we think, either derived from the ancient Iberians, or from a common source with that people. Not only was Spain peopled

* Strabo, iv., 1, § i.; iv., 2, § i. Τοὺς δὲ λοιποὺς Γαλατικὴν μὲν τὴν ὄψιν.

by the Iberian race, but even in historical times a considerable part of Gaul; and there is no improbability in the conclusion of its having occupied the British Islands likewise, as is, indeed, asserted by some ancient historians.*

"XIII. As to the origin of the Iberians themselves, it is better to confess our ignorance than to indulge in premature speculations. Some, as Professor Vogt, would bring them from America, by way of a lost Atlantis, or 'connecting land between Florida and our own Continent, which in the middle tertiary (miocene) period was still above the water.' Others, as M. Broca, search for them in Northern Africa; others, in the more or less far East; whilst Professor Huxley finds in their crania, as in those of the other *dolichocephali* of Western Europe, Australian affinities, though without deciding on 'the ethnological value of the osteological resemblance.'

"XIV. In conclusion, I am content with having established, from archæological and osteological data, at least to my own satisfaction, the existence in this island of the west of two distinct races in pre-Roman times. One of these, I may repeat, which had lost its supremacy, at least in the south of the island, being the earlier and dolichocephalic, was probably Iberic; the other, being the later brachycephalic, was probably Gaulish, or in other words, Belgic."†

* Dionysius and his paraphraser Priscian say expressly that the Cassiterides were peopled by the Iberians:—"populus tenuit quas fortis Iberi." [Dion., *Perieg.* v., 563; Priscian, *Perieg.* v., 578.] The Cassiterides are termed by these writers *the Western isles whence tin proceeds*—a mere paraphrase of the word Cassiterides. Under this last designation, as used by the ancients, not only the Scilly Isles, but the Damnonian promontory and coasts, were generally included. The very ancient notice of the Cassiterides preserved by Strabo, represents the inhabitants as nomadic and pastoral, clothed in long tunics, covered by *black* mantles; a garb identical with that of the ancient Iberians of Spain, who are likewise described by the geographers, Diodorus and Strabo, as *melanchlæni*, or black-robed. [Diod. Sic., lib. v., c. 33; Strabo, lib. iii., c. 3, § 7; c. 5. § 2.]

† The Rev. W. C. Lukis has favoured me with a letter, in which the following passage occurs:—"Supposing the British dolichocephalous people to have been Iberians by origin, it is strange that they should not have left vestiges of their passage through Britanny and other parts of Gaul. At least, I have met with no long barrows that at all correspond to those of Wilts and other English counties. The construction of the tumuli of Britanny is quite of a different character, and when a chamber is found at one end of a long mound, it is clearly owing to its having occupied the centre of the original round barrow, which has become long by subsequent additions, and in the added portions other chambers are found whose architecture indicates a later date."—E. T. S.

Dr. Thurnam has arranged in a tabular form the results of the examination of thirty-one unchambered long barrows in Wiltshire. The position and character of the primary interment were made out satisfactorily in fifteen, and less satisfactorily in seven, or in all in twenty-two cases. Of this number there were twenty-one in which a skeleton, or more usually a pile of many skeletons, was found on or near the natural level at the base of the mound, and generally below the broad and high end of the tumulus, which is usually directed to the east. In seven cases there seems to have been a single skeleton; in two cases there were two, in two three, in two four, in two eight, in one fourteen, in one eighteen, and in four an indefinite number, described as "several," or a "great many," skeletons. In the remaining or twenty-second instance, the primary deposit appears to have consisted of the burnt bones of as many as seven or eight bodies, lying on the floor, near a hole or "cist" scooped out of the chalk rock.*

In a long barrow at Figheldean, opened by Dr. Thurnam, the bones of a single skeleton formed a small pile, very little to the east of the centre of the mound, and they appeared to have been disarticulated by the decay of the ligaments before their final interment; the bones in many instances not retaining their proper relative position, the head of one tibia being in juxtaposition with the malleolus of the other, and *vice versâ*. Much more usually, however, the human remains in the long barrows comprise numerous skeletons, which are described by Sir R. C. Hoare as "strangely huddled," or "thrown promiscuously together," or as "lying in a confused and irregular manner." The bones found by Dr. Thurnam in Tilshead East long barrow comprised the remains of eight skeletons, singularly cemented together, within a space of less than four feet in diameter, and about a foot and a half in depth. So much were they mingled, and so closely packed, that it was scarcely possible to regard this as the original place of burial; and it is almost certain they had experienced a prior interment, and had been removed to the spot where they were found, after the decay of the soft parts and the separation of the bones. The same appeared to have taken place in a long barrow (No. "165") near Stonehenge. In a long barrow at Norton Bavant the pile of bones consisted of the remains of at least eighteen skeletons, which were comprised within an area of about eight feet by three, and about eighteen

* 'Anc. Brit. Barrows,' 'Archæologia,' 1869.

inches in depth. There was great commingling of the osseous remains, and it was noticed that many of the bones of the limbs were absent, judging as to their proper number from that of the skulls. In all these cases it is obvious, that if the body had once been disinterred the bones must necessarily become disarranged, mixed, and perhaps broken, in such a manner as may perhaps explain some of the appearances presented by the bones exhumed from the long barrows. It is, indeed, highly probable, that, during the time the large and honorary grave-mound was in process of formation the bodies of the dead, and of those slaughtered in their honour, were deposited in some temporary grave, and subsequently disinterred for final interment in the complete, or nearly complete, long barrow. "I am, however, satisfied," adds Dr. Thurnam, "by repeated and minute examinations of the bones, that the very peculiar appearances which they present cannot be entirely explained in this way; but that they are due, as already stated, to the manner in which those who were sacrificed in the course of the funeral ceremonies were slaughtered, and who seem to have been literally 'brained' by the blows of a club or stone axe."*

In the Yorkshire long barrows cremation appears to have been practised, but cremation after a singular and imperfect fashion. Canon Greenwell mentions that he found a deposit of rubble in the central line of the long barrow at Scamridge.† Towards the eastern end of this rubble deposit there were found signs of burning, at first slight, but becoming gradually more evident, until at last the heat had been sufficiently intense to convert the stone into lime, and all traces of bone had disappeared.‡

Along the central line of the long barrow on Willerby Wold§ there was a deposit of calcined chalk and flint, three feet six inches in width, and about four feet in height. The evidence of burning became gradually less towards the west, where, thirty

* 'Anc. Brit. Barrows,' 'Archæologia,' 1869.

† See page 375. The Scamridge barrow stands nearly due east and west, and is 165 feet in length, 46 feet in breadth at the west and 54 feet at the east end. In height it ranges from seven feet at the west to nine feet at the east end.

‡ At the western end the deposit of rubble expanded itself into a regularly constructed cairn of stones, carefully laid in order from a centre. No remains were found beneath it, nor was there any indication that a body had ever rested there.

§ This tumulus is 132 feet in length, 50 feet in breadth at the east and 40 feet at the west end, 70 feet in height at the east and 5½ feet at the west end.

feet from the east end, a large quantity of charcoal in lumps was found, just above the natural surface of the soil, and below the charcoal some burnt bones. Beyond this, although the deposit of chalk and flint continued, there were no signs of fire. This mass of burnt chalk and flint was in some places so hard that it required the vigorous use of the pick to break it, whilst in others it was of a soft and greasy nature. At the bottom of the calcined matter, and principally about fourteen feet from the eastern end of the barrow, were numerous fragments of human bones, evidently dislocated and broken before they had been placed there, and enclosed in the hard calcined chalk and flint like fossils in the rock.

A long barrow on Heslerton Wold was removed, in course of agricultural operations, in 1862 and 1868. In this tumulus there was a similar deposit of hard burnt chalk, running along the central line of the barrow for some distance towards the west, in which were seen numerous remains of burnt human bones; there was no appearance of a whole skeleton, but rather as of dislocated and broken bones. At the east end of a long barrow, near Helperthorpe, removed several years since, the same peculiar calcined chalk deposit was observed, which had amongst it some broken human bones. This deposit was so peculiar that the workmen and others preserved specimens of it in their houses, thinking it was petrified matter, from the resemblance it bore to the accretions from springs highly charged with lime.

A very similar state of things was noticed by Sir Richard Hoare in the long barrow* upon Winterborne Stoke Down, near the road leading to Shrewton.† In this barrow was a rude conical pile of large flints, embedded in a kind of mortar made of the marly chalk dug near the spot. This rude pile was not more than four or five feet in diameter at the base, and did not exceed two feet in height; it rested upon a floor, on which had been a fire, the heat of which had been sufficiently intense to make the floor red, like brick. After removing the greater part of this pile, "we very unexpectedly found the remains of the Briton below, and were much astonished at seeing several pieces of burnt bones intermixed with the great masses of

* No. 3 on the large map, 'Anc. Wilts.'

† This barrow stands nearly east and west, the broad end being towards the east. It measures 104 feet in length, 64 feet in width at the large end, 45 feet at the small end, and does not exceed three or four feet in height.

mortar, a circumstance extremely curious, and so novel, that we know not how to decide upon the original intent of this barrow." *

Canon Greenwell has remarked upon the great similarity between the way in which the bodies seem to have been deposited in the long barrows at Willerby and Scamridge. In both there are the scattered and broken bones laid below a mass of rubble, and in a direction east and west. In both there is evidence that to this mass fire had been applied, so that the bones became burnt by the igniting of the limestone or chalk which overlaid them. In both instances, after the firing had taken place, the barrow appears to have been heaped upon the yet heated matter, for a certain amount of redness, due to the action of fire, was observed upon the oolite and chalk rubble which was in immediate contact with the calcined stone. The Yorkshire long barrows appear to have been raised in the following manner:—A greater or less number of human bodies, their bones dislocated and broken, and the flesh probably removed from them, were placed on the natural surface soil, † or upon a bed of forced clay laid upon the natural surface, ‡ in a line which ran east and west. Over these was then placed earth or broken stone, of the kind nearest at hand. § This was then subjected to the action of fire, probably by means of wood placed above and alongside the deposit of stone or soil covering the bones; whilst the mass was still burning, the large mound of the barrow was thrown up over it.

It has been mentioned ‖ that regular strata of sand were observed in the "altar mounds" of Ohio; this feature has also been noticed in some of the tumuli of Britanny.

The large tumulus, known as Mont St. Michel, at Carnac, was constructed with strata of sand. "The exterior coat of the tumulus is composed of small blocks of granite, now, by lapse of time, covered with turf." This outer coat of granite blocks is about two feet six inches in thickness, "beneath which was found a bed of light, dry, sea-sand (vase), which extended to the depth of four or five feet, when the stones appeared again

* Hoare, 'Anc. Wiltshire,' vol. i., p. 117.

† As at Willerby.

‡ As at Scamridge.

§ At Scamridge oolite, at Willerby chalk and flint.

‖ Page 348. See also p. 353, fig. 22; p. 355, fig. 24; p. 356, fig. 25; p. 357, fig. 28; p. 358, fig. 30; p. 359, fig. 32; p. 365, fig. 37; p. 366, fig. 38.

below.* The Rev. E. L. Barnwell, in summing up his account of the examination of this tumulus by M. de Galles, points out that a pile of combustible matter was raised probably on the actual spot on which the stone chamber was subsequently constructed. The burnt fragments of granite found with the remains had, no doubt, been detached by heat from the surface of the rock. During the burning of the corpse,† some of the stone hatchets‡

* E. L. Barnwell, 'Saint Michael's Mount, Carnac,' in the 'Archæologia Cambrensis,' 3rd series, vol. x., p. 47.

† The Rev. W. C. Lukis is of opinion that the practice of burning the dead was nearly unknown during the period of megalithic chambers.

‡ The following is a list of the objects found in this tumulus, casts of many of which may be seen in Case D 16, Nos. 1 to 12. See page 103.

1. Eleven hatchets of jade, in perfect preservation, measuring from fifteen inches to two and a half. Two were perforated with a hole in the smaller end. One of these two last-mentioned had been broken in three parts, two of which were found lying at one end of the chamber, and the third at the opposite extremity. The position of the fragments clearly indicates that the implement was broken previously to its being deposited. Another hatchet showed that it was intended to be bored; but the workings on each side not exactly corresponding with one another, the attempt had been given up, and the implement was left in an unfinished state.

2. Two large hatchets of a coarser material than the preceding, both of which had been broken across.

3. Twenty-six small hatchets, in hard and compact tremolithe, all provided with very sharp cutting edges. One of these has two such edges, one at each extremity.

4. Nine pendants (*pendiloques*) and one hundred and one small beads, chiefly of jasper; all pierced, and evidently the remains of one or more necklaces.

5. Two fragments of flint.

These objects, together with the very fine collection obtained from the dolmens of Britanny, are preserved in the Museum of the 'Société Polymathique du Morbihan,' at Vannes; and no better wish can be expressed than that those who may have the good fortune to inspect this magnificent collection may do so under the guidance of M. Davy de Cussé, whose kindness will not soon be forgotten by the present writer.

The hatchets found in Mont St. Michel were grouped more thickly towards the western than the eastern side of the chamber, and were so placed in relation to the remaining two sides as to leave an open space in the centre, with a view apparently to some particular purpose.

One of the most remarkable circumstances connected with the discovery is the fact that all the hatchets were placed vertically, the smaller ends downwards, the cutting edges projecting more or less above the surface of a thick bed of soft impalpable dust, which covered the whole floor, and felt to the hand like wheaten flour. This dust was found to be a mixtnre of earth and ashes. Beneath this layer of dust was an irregular pavement of flat stones, underneath which was the actual grave, containing the remains of a human body previously reduced to ashes by intense heat.

were thrown into the fire. The ashes, mixed with vegetable matter (charcoal, &c.), were then collected and placed on the spot, and covered with the flat stones which formed the floor of the chamber. The surface of this floor was then thickly covered with a bed of earth, &c., in, or on, which were deposited the necklaces and the hatchets in the position they were found. A chamber was built, consisting of three walls,* of rude, horizontal courses, alternately of large and small stones, without mortar; the chamber was covered by a single large slab; the eastern side, which had been the entrance, was then closed with two vertical slabs of granite. The whole was covered up with fragments of rock, over which was laid the light sand to a considerable thickness, and, finally, the outer covering of stones placed over the sand completed the work.

The mound of Tumiac also consists of alternate beds of stone and sand. This mound, however, is principally composed of sand, with layers of stone, as if for the purpose of securing the lighter material. The sand used in constructing the mound of Tumiac, as well as Mont St. Michel, appears to have been obtained from the sea-shore, which is at some little distance, a circumstance that must have considerably increased the labour of the builders.

Strata of sand have also been observed in some of the Yorkshire tumuli, which have been so carefully examined and studied by Canon Greenwell. Two of the mounds, in the group known as the "Three Houes," on Egton South Moor, were found to be composed of alternate layers of sand and turf; "the bands of yellow sand and dark-coloured turf showed a beautiful section as we proceeded."†

A still more remarkable mode of construction was noticed in a mound on Hall Moor, near Castle Howard. A stratum of sand, gravel, and clay, eighteen inches in thickness, burnt into a hard mass, was met with, at the depth of three feet from the surface of the barrow. This stratum extended throughout all that part of the mound which was examined. At and around the centre it was almost as hard and red-coloured as brick, and must have been subjected to strong, long-continued heat. The calcined human remains, reduced to a small compass, were found

* The northern, southern, and western—the north side measured nearly two yards and a half, the south side two yards, and the east a yard and a half; the western side measured rather less than the eastern (entrance) side.

† Greenwell, 'Anc. Grave-hills in N. Riding, Yorkshire'—'Archæol. Journal,' vol. xxii., pp. 113, 114.

near the centre of the mound, resting upon this burnt stratum. In a barrow, made of sand, near the above mound, Canon Greenwell found the remains of a burnt body deposited in a simple cist, sunk about six inches below the level of the surface soil. Over this cist, and overlapping it, was a layer of charcoal, one inch in thickness, and above this was a stratum of clay and sand, hardened by fire, about four inches in thickness, which extended through the whole barrow.*

Canon Greenwell opened a tumulus near Scale House, in the parish of Rylston, which contained a stratum of stones, similar to that noticed in Mound No. 5, "Clark's Work," Ohio.† In the Yorkshire tumulus, over the centre, and just beneath the surface, was a layer of flat stones, carefully arranged. Under this the clay was well packed, and lay upon a thin stratum of dark earthy matter, full of charcoal, below which was a layer of finer clay, better worked than that above the earthy matter. Beneath this was an interment in a rude oaken coffin, formed of the trunk of an oak split in two, and then hollowed. The coffin rested upon a bed of clay.‡

Another tumulus, near Casten Dike, about thirty feet in diameter and four feet in height, was found to be composed wholly of stones. They were regularly laid from a central point, overlapping each other. On approaching the centre these limestone flags became larger, and were placed with great regularity, sloping from the centre on every side. Beneath this pile of stone was a layer of clay, about six or eight inches in thickness, placed there purposely, and containing nothing more than a few fragments of charcoal.§

In some instances a layer of sand appears to have been placed over the body, even although similar layers were not present in the mound itself. This was the case in a tumulus on Amotherby Moor, near Castle Howard, opened in 1868. The primary interment, contracted, in this mound had taken place by inhumation. The head was surrounded with stones. The skeleton was resting upon a thick bed of charcoal, and was covered with a stratum of sand, nine inches in thickness, above which was a second layer of charcoal.‖

Chambers constructed with timber, analogous to those

* Greenwell, *l.c.*, pp. 251, 252.

† Page 365.

‡ Greenwell, *l.c.*, p. 253.

§ Ibid., p. 115.

‖ 'Malton Messenger,' 8th February, 1868.

met with by Squier and Davies in certain mounds in Ohio,* have been found in some of the Yorkshire tumuli.

In a barrow near Ganton Dale, opened by Canon Greenwell, in April, 1867, a cist was found, which had been made of planks, supported upon stakes. At the west end of the grave there were five stake-holes, of which casts were taken in plaster of Paris. These were about ten inches in depth, and showed that the stakes had been of wood, and round, about two inches and seven-eighths in diameter, "pointed in the modern way, proving that the Britons had the means of sharpening, in a clean, angular manner, the timber stakes used." At the eastern end of the grave were six stake-holes of a precisely similar kind. At the bottom of the cist was a quantity of black matter, apparently the remains of decayed wooden planks, and the same appearances were noticed behind the stakes; indeed, the clay on the sides of the grave retained impressions of wood. In the chamber was an inhumed skeleton, laid on the right side, the head being to the north-west. Associated with the skeleton was a "food vessel." In the mound were one long and four round flint scrapers, and a flint spear-head, delicately chipped.† In another instance it would seem that stakes had been driven in as a protection to the head of the corpse. Canon Greenwell opened a tumulus on Duggleby Wold, in May, 1867. In it was found an inhumed skeleton, contracted, and laid upon the right side. The head was to the west, and had been protected by four wooden stakes, which had been driven about ten inches into the ground. The stakes had been from one inch and a half to two inches in diameter, and had not been all of the same thickness. All had been sharpened by a clean-cutting implement. Three out of the four stakes had been angular. The objects found associated with the skeleton were a long flint flake, two "thumb-flints," three rubbed beach pebbles, and some flint chippings.‡

The Rev. E. L. Barnwell has directed attention to the difference in the interment of the body or bodies in two tumuli, Mont St. Michel and Tumiac, both being of the same class and apparently of the same age. In the Tumiac chamber the body had been placed in its natural state; in that of Mont St. Michel complete incineration had first taken place.

* Pages 367, 368.

† 'Malton Messenger,' April 13, 1867.

‡ Ibid., May 4, 1867.

It is true that the two tumuli are not of the same form, that of Mont St. Michel being very long, whilst that of Tumiac is of the conical form. Yet the same kind of implements and ornaments, some of them in each case broken, were found in both. The layers of stone and sand occur in both, although not exactly in the same manner. They are both within the same locality, are divided only by a narrow channel, and must, without doubt, be assigned to the same age and the same builders. Yet in one instance the interment had taken place by simple inhumation, in the other by cremation; these two tumuli "seem to afford additional proof that the builders of them adopted both methods at the same time, neither system existing to the exclusion of the other. It was so with ancient Greece, and more or less continued until the fourth century of the Christian era, as well as in Italy. Marius was buried; Sulla was the first of the Cornelia gens whose body was burnt, according to Cicero; while we have a still more ancient proof that the double practice existed anterior even to these dates in the law of the Twelve Tables: 'Hominem mortuum in urbe ne sepelito neve urito.'

"Of all the monuments usually called Celtic, whether of pillar-stones, chambers, circles, avenues, &c., the simple chamber, cromlech or dolmen, with or without its covered gallery, is now generally acknowledged to be the earliest. The fact of the two practices of inhumation and burning being found co-existing in the same locality, and under circumstances almost identical, remains to be explained by those who place the former practice at a much earlier period than the latter."*

Canon Greenwell has thus expressed his opinion upon this subject:—"I have no doubt that inhumation and cremation were practised at the same time. In fact, there must have been a period, during which the new mode was coming into use, when both were prevalent; but, besides this time of change, I believe that, for some unknown cause, during the time that cremation was in use, some bodies were interred unburnt, and *vice versâ*. I opened a barrow in Northumberland, which had a central cist, containing the unburnt body of a child of not a year old, and an urn of the late type, whilst, placed round the cist, were nine interments of burnt bodies enclosed in urns. As

* Barnwell, 'Archæologia Cambrensis,' 3rd series, vol. x., pp. 53—57.

far as I was able to judge, the mound had been raised at one and the same time."*

"In barrows where many urns, evidently of contemporaneous deposition, and all containing burnt bones, are found, it is difficult to understand how it happened that so many persons were buried at the same time. We may suppose that, occasionally, an epidemic or a battle had caused many deaths, and therefore the necessity for several burials at one time; but the finding of more than one interment in a barrow is so common, that such a mode of accounting for it appears to be scarcely satisfactory. It has occurred to me," says Canon Greenwell, "that the dead may have been burnt and inurned, and then kept unburied until, at the decease, perhaps, of the head of the family, a barrow was raised over his remains; when the other members who had died before him, and whose burnt bodies were preserved, each in its urn, were placed in the tumulus with him. This feature may also be accounted for on the supposition that some of these burnt bodies are the remains of wives or other persons slain at the burial of the chief.†

"At Acklam Wold, in the East Riding, there are ten or twelve barrows, some of which were opened, in 1849, by the Yorkshire Antiquarian Club. In these, unburnt human remains were found, evidently the principal interments; and *associated* with them were burials of burnt bodies, one of which had apparently been placed so near a skeleton when the bones were hot, that the knees were completely charred. These barrows, judging from the urns found in them, were of the later unburnt period."‡

In a barrow upon Ganton Wold, opened by Canon Greenwell, in April, 1867, some interments were met with, which illustrate the successive modes of burial adopted. At the inconsiderable depth of eight inches, the inhumed remains of an Anglo-Saxon lady were found; three bronze fibulæ, a bronze buckle, a clay "spindle-whorl," some amber and glass beads, and two characteristic urns were associated with this interment. At a lower level was a burial by cremation, the body having been burnt on the spot; with this were associated an "incense cup," and a flint scraper, which had been burnt with the body. Immediately beneath the burnt interment, in a grave sunk in the chalk, was

* 'Trans. Berwickshire Nat. Club,' vol. iv., p. 390. Greenwell, 'Proceedings Geol. and Polytechnic Soc. W. Riding Yorkshire,' 1867, p. 534.

† Greenwell, 'Archæol. Journal,' vol. xxii., p. 249, *note.*

‡ Ibid., vol. xxii., p. 258, *note.*

an inhumed skeleton, contracted, and laid on the right side, with the head to the N.W.;* the skull was protected by large stones. This was the primary interment, and the only object found associated with it was a water-worn quartz pebble. This barrow shows us, first, an interment by inhumation, then a subsequent interment by cremation, and, over all, the return to the inhumed burial by a much later people.†

Canon Greenwell has made the following remarks upon the burials by cremation in the north of England, other than in the long barrows, which have come under his notice. After the body was more or less consumed, which it appears to have been in most cases, accompanied with certain of the deceased person's arms, implements, or ornaments, the ashes were gathered and placed either in an urn of imperfectly-baked clay, or in a stone cist, a hollow made in the ground, or merely placed upon the surface. Sometimes this was done on the very place of the burning, but more frequently at a little distance apart from it. Over the deposit of calcined bones a mound of earth, or stones, according to the nature of the locality, was then raised. Whilst this was taking place, the friends or relatives appear to have thrown in, from time to time, chippings of flint or quartz, and fragments of pottery, it is probable with some symbolical meaning.‡ With the burnt bones, besides the weapons and implements which have been burnt with the body, are not unfrequently deposited unburnt arrow-heads, knives, and ornaments.§

* "On the whole, the body is more frequently laid upon the left side, but there is no rule as to the direction in which the head has been placed, for I have found it to all points of the compass."—Greenwell, 'Proc. Geol. and Polytechnic Soc. W. R. Yorkshire,' 1867, p. 536.

† 'Malton Messenger,' April 27, 1867.

‡ The custom of throwing shards, and flints, and pebbles into the grave is common both to Romano-British and to Anglo-Saxon interments in England. That it was Pagan, and even of very early origin, seems probable, and that it persisted into Christian periods is pretty certain. The well-known line in Shakspere—

> "Shards, flints, and pebbles should be thrown on her."
>
> HAMLET V, I.,

and the context show, however, that its Pagan origin had somehow or other so strongly impressed itself upon the public mind that it was no longer practised in Christian burials. They show, also, that the presence of these shards cannot be explained as being due to accident.—Dr. Rolleston, 'Excavations at Frilford,' 'Archæologia,' 1870. I have to thank Dr. Rolleston for a sight of a proof of the above valuable paper.—E. T. S.

§ Greenwell, 'Proceedings Geol. and Polytechnic Soc. West R. Yorkshire,' 1867, p. 533.

"A mode of burial of burnt bodies is found," says Canon Greenwell, "which some suppose to belong to an earlier period than that in which the calcined bones are placed in an urn, but which more probably marks the graves of persons of humbler rank than those over whom the larger tumuli were raised. The mounds over these interments are small, and the bones are contained in a circular hollow sunk in the ground, without any urn; this hollow, in fact, being a receptacle similar to an urn, and supplying its place. I know of an instance near the village of Ford, in Northumberland, where about thirty of these circular hollows occurred close together, and each covered with a flat stone, on the under side of two of which some concentric circular markings were engraved.* Nothing except some calcined flint chippings were found with these burials, which may, perhaps, be regarded as interments of the mass of the community."†

The Rev. W. C. Lukis found that cremation, with one exception, had been practised in all the tumuli examined by him in the neighbourhood of Wath, near Ripon; and that, with two exceptions, the bodies appear to have been burnt *in* the circular pit or cist dug out of the natural soil. The late Mr. Thomas Bateman, in his "Ten Years' Diggings," mentions that, in Derbyshire, he found several instances of the mound covering the actual spot where the corpse had been reduced to ashes. In one locality, where there is a group of about fifty tumuli, some of which he opened, he found "in every instance that the mound had been raised over calcined human bones, which lay in the same place on the natural surface as they occupied when the funeral pile was *smothered out* by casting up the tumulus."‡ "The difference," says Mr. Lukis, "between the custom he (Mr. Bateman) describes and that observable in our neighbourhood is, that the funeral pile in Derbyshire was made on the natural surface, whilst in this part of Yorkshire the body was burnt in a pit or cist."§ Mr. Lukis mentions that no cists were observed in the tumuli

* A notice of "cup-cuttings" will be given when the objects found in the Ohio mounds are described.

† 'Archæol. Journal,' vol. xxii., p. 259, *note.*

‡ This *smothering out* of the funeral pile has been noticed in the Ohio mounds. See page 369.

§ The late Mr. Kemble has mentioned that in removing a barrow, at Elze, near Hildesheim, six cists, resembling those noticed by Mr. Lukis, were found. Five of these were nearly filled with charcoal, and over each a skeleton lay at

examined by the Yorkshire Antiquarian Club in the south-eastern district of that county; and he quotes from a letter upon the subject which he has received from Dr. Procter, of York. "In our excavations we never found the state of matters alluded to in your note. A well-marked pit we never saw, and I think the only approach to a rude cairn was at Aldrow. The various modes of early burial in detail is a curious question, and evidently varied in different tribes. I think our own experience in Yorkshire led us to this conclusion, for there were differences in interments apparently of the same or similar date."*

According to D'Urville the natives of New South Wales *buried* the young and *burnt* the old,† thus affording us an instance of the practice of inhumation and of cremation by one and the same people, at one and the same period. Captain Wilkes mentions that, as soon as an Australian dies, the corpse is arranged in a sitting posture; the knees are bent up close to the body, the head is pressed forwards, and the whole body is closely tied up in a blanket. An oval grave is then dug, about six feet in length, three in width, and five in depth. At the bottom is placed a bed of leaves, covered with an opossum-skin cloak, and with a stuffed bag of kangaroo-skin for a pillow; on this the body is laid, with the implement and weapons which had been used by the deceased. Above the corpse leaves and branches are strewn, and the hole is then filled up with stones. Finally, the earth which had been removed is put over the whole, making a mound eight or nine feet in height.‡

Some of the oldest tumuli of Scandinavia are large mounds, containing a passage, formed by great blocks of stone, almost always opening towards the south or east, and leading into a sepulchral chamber, around which the dead had been placed in a sitting posture. At Goldhavn, for instance, a grave of this kind was opened in 1830, and numerous skeletons were found, placed in a sitting posture on a low seat round the walls, each with his weapons and ornaments by his side.

full length upon its back.—'Burial and Cremation,' 'Archæol. Journal,' vol. xii., p. 329. The authority cited is 'MSS. Reports,' in the possession of the 'Historical Soc. of Hanover.'

* See paper upon 'Flint Implements and Tumuli of Wath,' by the Rev. W. C. Lukis, in the 'Yorkshire Archæological Journal,' 1869, part ii., pp. 116—125.

† D'Urville, vol. i., p. 472.

‡ Wilkes, vol. ii., p. 195. 'Prehistoric Times,' p. 353.

In some of the south of England chambered tumuli the bodies appear to have been placed in a sitting posture, resting against the walls of the chamber. Thus, in the eastern chamber at Charlton Abbots, Gloucestershire, there were twelve skeletons, representing as many bodies, which, Mr. Winterbotham tells us, "must have originally been placed squatting on flat stones round the walls." At West Kennet, Wilts, the remains of six skeletons were found, the original position of which must have been very similar. In the chambers at Avening, Gloucestershire, Mr. Fosbrooke tells us that the bodies had been "placed in a sitting posture, with the feet crowded together." At Uley, Gloucestershire, the same crouched position against the walls, at least in one instance, was noticed.*

In the very early Anglo-Saxon poem of Beowulf, there is a notice of what was evidently a chambered tumulus, the main features of which are described with considerable minuteness. In its recesses were treasures—weapons and rich ornaments, and vessels of heathen gold—and watched over, as the story goes, for three hundred winters by a dragon. The barrow was of stone, with a passage under it unknown to men, the work of giants,† the cave within was built up with stone arches and made fast on props.‡

tō ðæs ðe he eorð-sele	because that he *the* earth-hall
ǣna wisse,	alone knew,
hlǣw under hrūsan.	*the* mound under *the* earth, §
* * *	* * *
ðā se æðeling gong,	then *the* prince went,
þæt he bi wealle,	*so* that he by *the* mound,
wīs-hycgende,	wisely thinking,
gesæt on sesse;	sat on a seat;

* Thurnam, 'Anc. Brit. Barrows,' 'Archæologia,' 1869.

† These megalithic tombs are called *Jettestuer*, Giants' chambers, in Denmark. In North Germany they are known as *Hünenbetten*, in Holland as *Hunebedden*. These words have been erroneously supposed to mean the Huns' graves ('Archæologia,' xxxiv., 442). *Hüne*, in German, is a giant. The long barrow of Fyfield, Wilts, is known as the *Giant's Grave*, the chambered tumulus of Luckington is called the *Giant's Caves*. In Denmark, chambered tumuli have as a second name that of Fairies' or Goblins' Chambers, *Troldestuer*. The same term is applied to them in England. Thus the chambered tumulus at Nempnet, in Somersetshire, is called the *Fairy's Toote*. —Thurnam, 'Archæologia,' 1869.

‡ Thurnam, 'Anc. Brit. Barrows, 'Archæologia,' 1869.

§ 'Beowulf,' Thorpe's translation, 4811—4813.

seah on enta geweorc,	look'd on *the* giants' work,
hū ðа stān-bogan,	how the stone arches,
stapulum-fæste,	on pillars fast,
ēce eorð-reced	*the* eternal earth-house
innan healde.	held within.*

The "winter houses" of the Esquimaux and Greenlanders, the "Yurts †" of the Siberians, closely resemble these Scandinavian *gång-grifter*, or passage graves, and there is great probability in the view advocated by Professor Nilsson, that these *gång-grifter* are a copy, a development, or an adaptation of the dwelling-house; that the ancient inhabitants of Scandinavia, unable to imagine a future altogether different from the present, or a world quite unlike our own, showed their respect and affection for the dead by burying with them those things which in life they valued most: with women their ornaments, with warriors their weapons. They buried the house *with* its owner, and the grave was literally the dwelling of the dead. ‡

The Esquimaux have a superstitious objection to use, or even touch, anything which has been in a house containing a dead body. § When, therefore, any person is dying, they place by him everything which can soothe and comfort his last moments, and then leave the igloo, or house, which they close up, thus converting it into a tomb. ‖

The following notice of the materials used by the mound-builders for their "gorgets," smoking-pipes, &c., has been most kindly contributed by Professor Church, of the Royal Agricultural College, Cirencester, who not only carefully examined the specimens themselves, but has made analyses of the principal varieties which occur in each class of material.

* 'Beowulf,' Thorpe's translation, 5424—5432.

† The Siberian Yurt consists of a central chamber, sunk a little in the ground, and, in the absence of great stones, formed of timber, with earth heaped upon the roof and sides, causing it to resemble a mound. The opening is towards the south. The fireplace is opposite the entrance; and round the sides of the room against the walls "the floor is raised for a width of about six feet, and on this elevated part the inmates slept at night, and sat at work by day." Erman, 'Voyage to the Pacific Ocean,' vol. ii., p. 450; vol. iii., p. 374. The description given by Cook of the winter habitations of the Tschutski shows that they were very similar dwellings to those above mentioned.

‡ 'Prehistoric Times,' pp. 88—90. See also Nilsson, 'Stone Age of Scandinavia,' pp. 124—168.

§ Hall, 'Life with the Esquimaux,' vol. i., p. 201; vol. ii., p. 221.

‖ 'Prehistoric Times,' p. 409.

MATERIALS OF THE OHIO PIPES.

The materials of the Ohio pipes and other objects are almost exclusively of four kinds; or rather they may be classed under four distinct heads, although two or more varieties of some of the materials occur. The materials are sculptured native substances, and have not been moulded or fashioned by pressure, nor hardened by subsequent baking. Sir John Lubbock, however, erroneously describes the Ohio mound pipes as "characteristic specimens of ancient American pottery."* I will first name the four sorts, and then proceed to describe their individual physical and chemical characters:—

A. A hard and silicious clay slate, approaching more or less closely in different specimens the *whetslate* of Cotta.†

B. An argillaceous ironstone,‡ usually variolitic.

C. A pearly-brown ferruginous *chlorite*.§

D. Calcareous marls of variable composition, and marly limestones.‖

A. Whetslate.

I have particularly examined a fragment of a "gorget" made of this stone (S and D 494). It has the hardness 6·5 on the mineralogical scale. Its density is 2·76. On analysis it gave in 100 parts:—

Silica (with some alkali) . .	61·35
Ferrous oxide (protoxide of iron)	14·28
Alumina	19·33
Magnesia	·33
Lime	1·34
Combined water . . .	3·37
	100·00

This material is a more or less highly silicious variety of clay

* 'Prehistoric Times,' 2nd edition, p. 250.

† Cotta, 'Rocks Classified' (Eng. ed., 1866), p. 265.

‡ Dana, 'Mineralogy' (1868), p. 141.

§ Ibid., p. 495.

‖ Cotta, *l.c.*, pp. 272—279.

slate, almost perfectly compact, and often very distinctly stratified with dark bands, in which most of the iron of the rock seems collected. It breaks with an irregular conchoidal fracture, almost without a trace of the peculiar cleavage known as slaty. It generally forms a good hone stone. The skill with which the mound-builders have pierced and worked this hard and tough stone is remarkable. Among the most characteristic specimens of whetslate in the Blackmore Museum we may name the following:—Case A 48, No. 35;* Case A 49, No. 1;† No. 9; No. 11,‡ which shows fracture; No. 27,§ which shows stratification; Case A 50, No. 3. A further remark should be made as to one specimen in the Collection, Case C 35, No. 10,‖ which shows the junction of whetslate with a peculiar felspathic stone which has been described as greenstone ash, and is distinctly porphyritic in texture. The Cornish *killas* now and then passes, just in the same manner, into a porphyritic rock.

B. Argillaceous Ironstone.

This stone, like the whetslate above described, is not a definite mineral, but a mixture of minerals—a rock. Its hardness varies in different parts of the same specimen—the harder parts approaching 6, and the softer parts not exceeding 4·5. These softer parts are paler in colour, contain much less iron than the harder parts, and seem to consist of minute globules of a compound silicate, perhaps a felspar. Some of the pipes and other objects fashioned from this ferruginous stone are much fissured internally, and blacker inside than out. When most compact this stone has the density 4·3; when least so, about 3·07. In the following analysis the silica was ascertained "by difference," and includes a little alkali. In 100 parts there are:—

Silica	46·42
Ferric oxide (peroxide of iron)	34·80
Alumina	16·45
Magnesia	·46
Lime	1·48
Water	·39
	100·00

The Collection contains many examples of this curious clay ironstone. Some of these approach in structure to the red

* S and D 493. † S and D 492. ‡ S and D 486.
§ S and D 501. ‖ S and D 626.

pipestone (Coteau des Prairies), often termed *Catlinite*. But they are more variolitic in texture, and much more mottled and diversified in colour. Some specimens are iron grey or dark brown; others pale grey, spotted with white. Case A 50, Nos. 25 and 26, are specimens of the pale variety of this stone; the dark grey and brown varieties may be seen in Case C 35, No. 8,* and in Case C 38, No. 9.† No. 14,‡ in Case C 38, shows distinctly the white spots seen in some specimens of *Catlinite*. No. 6,§ No. 12,‖ and No. 13,¶ in Case C 35, approach *Catlinite*. Other good specimens are No. 5,** Case C 34; No. 6,†† Case C 36; and No. 11,‡‡ in Case C 37.

C. Chlorite.

This is an obscure and perhaps rare variety of the mineral known as chlorite. But though this stone is apparently a definite mineral species, the term chlorite is rather wide, and very careful optical, as well as chemical, analysis is needed to refer such specimens to their proper place.§§ The hardness of the particular piece of Ohio chlorite (S and D 553) which I have specially studied is 2·75; its density is 2·9. The stone is made up of small lamellar crystals, presenting a varied lustre, a pearly aspect, and a pinchbeck brown colour. It appears to be accompanied by a trace of quartz. The most characteristic specimens of this chlorite in the Blackmore Collection are the following:—Case B 33, Tablets 12, 13; and Case H 4, No. 3.‖‖ A more ordinary variety of chlorite, soft and green, may be seen in Case A 50, Nos. 25 and 26.

D. Calcareous Marls and Marly Limestones.

Some of the pipe materials are characterised by strong effervescence with acids. Some of them seem to have been made from marls; that is, natural earthy mixtures of clay and calcareous matter. From their composition and softness, they would offer less difficulty in manufacture, but would be more liable to injury both by moisture and fire than the materials already described. They are varied in colour, but are generally

* S and D 683. † S and D 678. ‡ S and D 674.
§ S and D 684. ‖ S and D 619. ¶ S and D 624.
** S and D 600. †† S and D 620. ‡‡ S and D 643.

§§ For the best classification of the species and varieties included under chlorite, see Descloiseaux, 'Mineralogie,' tome i. pp. 435—483.

‖‖ S and D 581.

pale and of earthy aspect, and adherent to the tongue. Some are white, some buff and brown, and some marbled. One of the pieces analysed (No. 1) was slightly sub-crystalline, but usually they are quite amorphous and homogeneous in texture. Their hardness varies somewhat, but is never high. No. 1 has the hardness 2·3, and No. 2 is 2·0. The density of both is about 2·5.

The following are the analytical results from two of these calcareous materials :—

	Calcareous Marl. No. 1.	Marly Limestone. No. 2.
Silica	27·18	5·31
Alumina and ferric oxide	11·95	2·23
Calcium carbonate (carbonate of lime)	45·97	82·49
Magnesium carbonate (carbonate of magnesia)	13·55	4·05
Other substances and loss	1·35	5·92
	100·00	100.00

The following specimens belong to this division as to material :—

Case A 48, No. 7,* Case A 49, Nos. 2, 3,† and 25 ;‡ Case C 34, No. 6,§ the white variety; Case C 34, Nos. 8, 10, 12,‖ the marbled variety; Case C 35, Nos. 3 and 5; ¶ Case C 36, No. 9.** Case C 37, No. 6, shows a darkening of one part. A discolouration probably produced by a process similar to the "stifle" burning by which the dark colour of the Roman pottery, known as Upchurch ware, seems to have been produced. Of course, the effect in the case now considered was an accidental result of the cremation.

A. H. CHURCH.

Royal Agricultural College, Cirencester,
December, 1869.

* S and D 477.
† S and D 490, 491.
‡ S and D 504.
§ S and D 608.
‖ S and D 593, 594, 592.
¶ S and D 687, 688.
** S and D 635.

OBJECTS FOUND IN MOUND No. 1, "MOUND CITY."*

E 6.

No. 1 is a vessel of brown ware, with a flat bottom; its general form is quadrilateral, with the angles rounded off. The upper part of the vessel is missing, but probably not more than the rim is gone; its present height is five inches, and its greatest diameter is five inches and a half. The clay is well tempered; the burning appears to have taken place in an open fire; there is a slight glaze upon the surface, due perhaps to the application of some resinous substance. This vessel is ornamented with incised lines, and dots of two sizes; the larger dots have been made with a narrow tool hollowed like a gouge; judging from the width, the lines may have been made with the same tool, although the hollowed side of the implement was not used in forming them. The pattern is divided into four compartments by lines and dots which occur at each of the angles. It has been suggested that the pattern in each of these compartments is intended to represent a bird; some of the lines *do* form an object having a faint resemblance to a bird's head and neck, with the eye correctly placed, but the beak is of a most unnaturally recurved shape.†

Sufficient examples of the "Mound" pottery have been recovered to prove the superiority in their workmanship, and their diversity in character and style of ornament, from the ordinary ware made by the present North American Indians.‡

Although of great symmetry of proportions, the "Mound" pottery was not turned on the wheel. Most of it is ornamented with scrolls, and other devices engraved in the surface, instead of being embossed upon it. The lines appear

* See pages 353, 354.

† This vessel is figured in the 'Anc. Mon. Miss. Valley,' plate xlvi., fig. 2. It is described at pp. 189, 190. The figure scarcely conveys a correct idea of the vessel; it is far less perfect than represented.

‡ Wilson, 'Prehistoric Man,' vol. ii., pp. 88, 89.

generally to have been cut with some sharp gouge-shaped instrument, which entirely removed the detached material without leaving any ragged or raised edges. None of the vessels are glazed, in the strict sense of the term, although one or two, either from baking or the great subsequent heat to which they were subjected, exhibit a slightly vitrified surface.*

Professor Wilson considers that some simple form of the potter's wheel may have been known to the mound-builders; that they may have discovered for themselves "some mechanical appliance involving the most essential elements of the potter's wheel."† Whilst Squier and Davis think it is "not impossible, but, on the contrary, extremely probable, from a close inspection of the 'Mound' pottery, that the ancient people possessed the simple approximation towards the potter's wheel, consisting of a stick of wood grasped in the hand by the middle, and turned round inside a wall of clay formed by the other hand, or by another workman."‡

The writer of this notice can see no reason for arriving at any such conclusion. The only vessel at all in a perfect state which has been recovered from the Ohio mounds by Squier and Davis, and which can be considered to belong to the period of the mound-builders, is No. 1 in Case E 6, and this is not even of a circular form. A careful examination of the internal surface has led to the detection of no striations such as would have arisen even from the use of a stick made to revolve in the manner suggested by Squier and Davis; while the bottom pieces of the "Mound" vessels show none of those marks so characteristically present upon wheel-made pottery.

Upon Tablets 2 and 3 are some copper bosses or flat beads, made of two plates of hammered copper, each having a central perforation; these bosses range from one and a half to two inches in diameter. Plates of mica were found in this mound.

Objects found in Mound No. 2, "Mound City."§

B. 34.

In this mound some shell and pearl beads were found, similar

* Squier, 'Ancient Monuments in the United States,' in 'Harper's Magazine,' vol. xxi., p. 175.

† 'Prehistoric Man,' vol. ii., p. 91.

‡ 'Anc. Mon. Miss. Valley.' p. 195.

§ See pp. 354, 355.

to those in this Case, upon Tablets 4 to 7; as well as the fragments of pottery upon Tablets 4 to 10. The objects upon Tablets 15 to 25 were found associated with a secondary interment. The specimens upon Tablets 19 to 21 are bone implements of different forms with curiously dentated edges. Upon Tablet 24 is a piece of red-deer's antler in process of manufacture into the handle of some implement. Upon Tablets 22 and 23, and in Case D 19 upon Tablets 16 to 19 are pieces of red-deer's antler, showing marks of cutting. The piece of antler upon Tablet 25 illustrates the way in which chisels such as those upon Tablets 16 and 17 were formed. A deep groove was sawn about half way through the horn on each side in order to guide the fracture; the severance was then effected by a sharp blow, after which the implement was rubbed into shape.

Objects found in Mound No. 3, "Mound City."*

Cases C 34 to C 36.

C 34.

Upon Tablets 15 and 16 (S and D 735) are fragments of the "altar." Upon Tablets 17 to 22 are fragments of leaf-shaped flint instruments, fractured by the heat to which they have been exposed. Leaf-shaped implements of similar type are met with upon the surface soil in America; one such, found in Cayuga county, New York, is preserved in Mr. Evans's Collection at Nash Mills. Nos. 23 and 24 (S and D 731) are two glass dishes containing pieces of manganese garnet. No. 25 (S and D 730) is a glass dish containing fragments of quartz crystals fissured by heat, among which are some unfinished implements.

C 35.

Upon Tablets 15 to 22 are leaf-shaped flint implements, all of which have been exposed to the action of fire. No. 18 (S and D 14), No. 19 (S and D 12), No. 20 (S and D 11), No. 21 (S and D 10), and No. 22 (S and D 15), are good specimens, and are nearly perfect.† In the dishes No. 23 to 25 are some fragments of quartz crystals fissured by heat.

* See pp. 355—357.

† A bushel or two of fragments of these leaf-shaped implements were found in Mound No. 3. 'Anc. Mon. Miss. Valley,' p. 151, fig. 100, p. 211.

C 36.

Upon Tablet 15 and in the glass dish No. 26 are fragments of leaf-shaped flint implements. Upon Tablet 16 is a barbed spear-head of obsidian. Upon Tablets 17 to 21 are fragments of arrow- and spear-heads of hyaline quartz, greatly injured from the heat to which they have been exposed. The specimens upon Tablets 20 and 21 are tolerably perfect. *b* Tablet 21 is part of a stemmed arrow-head of hyaline quartz; *c* is a leaf-shaped arrow-head of the same material.* Upon Tablet 22 are pieces of copper tube. Upon Tablet 23 (S and D 8) is a long, narrow, copper chisel.† No. 24, 𝔇,‡ (S and D 598) is a smoking-pipe of coralline limestone, of simple form. No. 25, 𝔇, (S and D 661) is a stone smoking-pipe, the bowl of which is in the form of a bird, perhaps intended for a toucan.§

The rude earthen vessel No. 28 (S and D 1), Case E 6, was found associated with a secondary interment in this mound.‖

Objects found in Mound No. 5, "Mound City."¶

C 38.

Upon Tablet 19 is a mass of fine clay, of which a considerable quantity was found in this mound.

Upon Tablets 20 and 21 are pieces of galena, a large quantity of which was also found in Mound No. 5.

Objects found in Mound No. 7, "Mound City."**

Case E 6.

No. 24 (S and D 727).—Plates of mica, found covering the

* Judging from the quantity of fragments, nearly a hundred arrow-heads of hyaline quartz must have been originally deposited on the "altar." 'Anc. Mon. Miss. Valley,' p. 151.

† 'Anc. Mon. Miss. Valley,' plate lxxxv., fig. 1, p. 200.

‡ The letters 𝔄, 𝔅, ℭ, 𝔇, appended to the numbers of the specimens refer to the several materials described at pp. 414—417.

§ 'Anc. Mon. Miss. Valley,' p. 151.

‖ Ibid., plate xlvi., fig. 4, p. 190.

¶ See page 358.

** See pp. 358, 359

"altar," arranged in the crescent-like form shown by Fig. 31, p. 358.

The presence of plates of mica in Mound No. 1, "Mound City," has been already noticed.*

Mica, cut into scrolls and circular figures, has been found in Mound No. 9, "Clark's Work," north fork of Paint creek, Ohio.† These specimens are shown in Case B 34. In the Grave Creek mound about 150 pieces of mica, an inch and a half or two inches square, each perforated with two or more small holes, were found.‡

In a mound near Lower Sandusky, Ohio, upwards of twenty oval plates of mica, each perforated with a small hole at one end, were discovered. Plates of mica with small perforations, found in the Ohio mounds, have been figured by Schoolcraft.§

The two wedge-shaped copper hatchets, Nos. 23 and 29 (S and D 5 and 3), Case E 6, were found near the surface of Mound No. 7, "Mound City," and perhaps belong to a secondary interment.‖

Objects found in Mound No. 8, "Mound City."¶

Cases C 34 to C 39.

C 34.

Nos. 1 to 17** are sculptured stone smoking-pipes found upon the "altar" of this mound. No. 3, 𝔇,†† is much injured from the heat to which it has been exposed. It is

* See page 419.

† 'Anc. Mon. Miss. Valley,' pp. 168—170.

‡ Ibid., pp. 168—170.

§ 'Archives of Aboriginal Knowledge,' vol i., plate xxx., figs. 1—3, p. 97. 'Observations respecting the Grave Creek Mound,' in 'Trans. Amer. Ethnol. Soc.,' vol. i., plate ii., fig. 7.

‖ Similar implements are figured in the 'Anc. Mon. Miss. Valley,' p. 197, figs. 81, 82.

¶ See p. 359.

** S and D 611, 606, 605, 597, 600, 608, 595, 593, 591, 594, 596, 592, 599, 603.

†† See pages 416, 417.

stained from having been in contact with some copper object. No. 4, 𝔅, (S and D 597) is made from a coralline limestone, a material no doubt selected on account of the beauty of the markings. No. 6, 𝔅, (S and D 608) is also made of coralline limestone. No. 11, 𝔅, (S and D 596) Fig. 41, is tastefully ornamented around the rim of the bowl. No. 12 𝔅 var.,* (S and D 592) Fig. 42, is ornamented with circular indentations.†

FIG. 41.

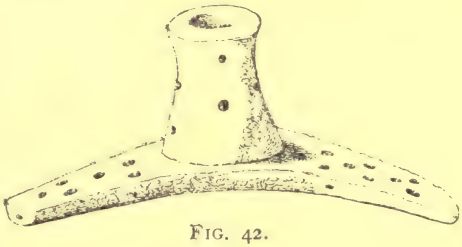


FIG. 42.

C 35.

Nos. 1 to 14‡ are stone smoking-pipes. The bowl of No. 2, 𝔅, (S and D 689) is in the form of a tortoise. See Fig. 43.

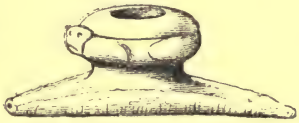


FIG. 43.

Nos. 3, 𝔅, 4, 𝔅, and 5, 𝔅, (S and D 687, 686, 688) each have a bowl in the shape of a frog, Fig. 44 (S and D 686).

FIG. 44.

FIG. 45.

* See pages 415, 416.

† Engraved in 'Anc. Mon. Miss Valley,' p. 227, fig. 126.

‡ S and D 682, 689, 687, 686, 688, 684, 685, 683, 636, 619, 624, 627.

Nos. 6, 𝔅, 7, 𝔇, and 8, 𝔅 var., (S and D 684, 685, 683) have the bowl in the form of a toad, Fig. 45 (S and D 683). The rough skin and the quaint attitude of this reptile are well rendered in the carving.*

Nos. 10† to 14 (S and D 626, 619, 624, 627), represent birds of various kinds, No. 11, 𝔅 var., is shown by Fig. 46; No. 12, 𝔅, (S and D 619) Fig. 47, represents the swallow;‡ a series of zigzag lines are to be noticed upon the belly of this bird. These

Fig. 46.

Fig. 47.

markings only occur in the mound-sculptures upon birds of rapid flight, and it is probable that this lightning-like marking was intended as a symbol of swiftness.§

No. 13, 𝔅 var., (S and D 624) Fig. 48, represents the tufted cherry-bird;‖ the head of this bird is out of proportion to the body—a not infrequent fault committed by the sculptors of the mound period. The fire upon the altar has, in nearly every

Fig. 48.

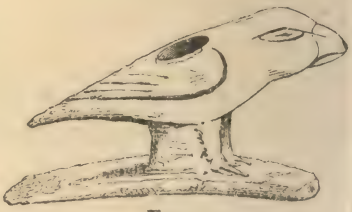


Fig. 49.

instance, destroyed the substance which was placed in the eye-sockets of many of the pipes; the pearl, however, which forms

* 'Anc. Mon. Miss. Valley,' fig. 183.

† No. 10 is made of a porphyritic felstone; see page 415.

‡ 'Anc. Mon. Miss. Valley,' fig. 167.

§ This idea was suggested to me by my friend Mr. De Wilde, to whom the public are indebted for the illustrations to the present work. He has been most successful in catching the spirit and feeling of the originals.—E. T. S.

‖ 'Anc. Mon. Miss. Valley,' fig. 174.

the eye of Fig. 48, No. 13 has escaped destruction. No. 14 (S and D 627), Fig. 49, has the bowl in the form of a bird.

C 36.

Nos. 1 to 14* are stone smoking-pipes, No. 2, 𝔅, (S and D 653) Fig. 50, represents the quail. No. 4, 𝔅, (S and D 642) Fig. 51, has the bowl in the form of a bird; No. 5, 𝔅, (S and D 652) the heron; and No. 6, 𝔅, (S and D 620) Fig. 52, the tufted heron;

FIG. 50.

FIG. 51.

the small body; long wings, extending to the extremity of the short tail; the long thin neck, sharp bill, and tufted head are faithfully rendered in this sculpture. The bird is represented in the act of striking a fish.† No. 11, 𝔅, (S and D 623) represents a bird; it has an inserted eye of some undetermined substance.

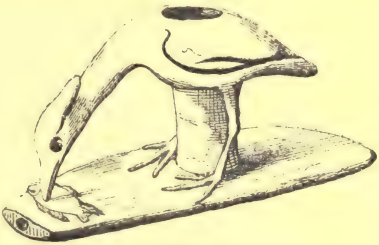


FIG. 52.

C 37.

Nos. 1 to 23‡ are stone smoking-pipes, No. 1, 𝔅, (S and D

* S and D 650, 653, 655, 642, 652, 620, 651, 636, 635, 646, 623, 632, and two fragments.

† 'Anc. Mon. Miss. Valley,' fig. 164.

‡ S and D 625, 629, 631, 632, fragments, 639, 638, 630, 637, 643, 647, 645, 664, fragments, 648, fragments, 649, 656, 694, 640, 601, 602.

625), Fig. 53, has the bowl in the form of a bird; No. 2, 𝔇 (S and D 629), Fig. 54, in that of a bird's head.*

FIG. 53.

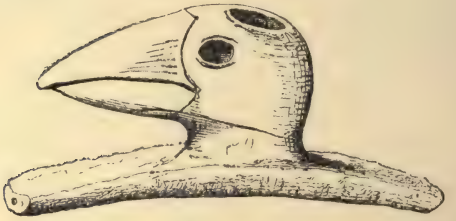


FIG. 54.

No. 3, 𝔇, (S and D 631), Fig. 55, represents a bird;† No, 4, 𝔅, altered by heat, (S and D 622), Fig. 56, the Toucan feeding

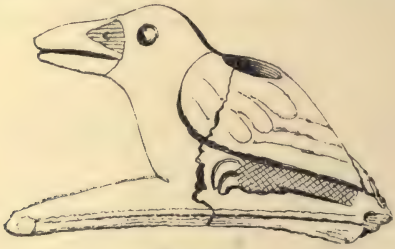


FIG. 55.

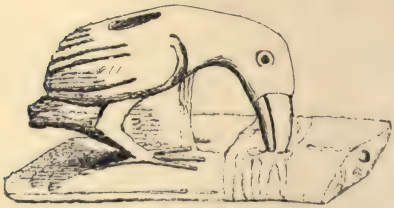


FIG. 56.

* 'Anc. Mon. Miss Valley,' p. 267, fig. 181.
† Ibid., p. 266, fig. 179.

from a human hand.* This bird is found in the tropical countries of South America. Pozzo mentions that the toucan can be very easily tamed. Other travellers inform us that these birds are very highly prized by the Indians of Guiana and Brazil, principally on account of their brilliant plumage. They pick off the skin from the breast, containing the most beautiful feathers, and glue it upon their cheeks by way of ornament. In some districts the toucan was almost the only bird the aborigines attempted to domesticate. The fact that it is represented, in the mound-sculptures, as taking its food from the human hand is, therefore, highly interesting. No. 7, 𝔅, Fig. 57; 8, 𝔅, and 22, (S and D 639, 638, 640), represent the Owl.

FIG. 57.

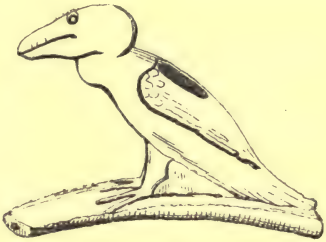


FIG. 58.

No. 9, 𝔅, (S and D 630), Fig. 58, represents the Turkey Buzzard.†

No. 10, 𝔅, (S and D 637) Fig. 18, is the unfinished pipe described at page 351. No. 19, 𝔅, also appears to be unfinished.

No. 11, 𝔅, (S and D 643), Fig. 59, is a fragment of a pipe which represents a bird of prey, either an Eagle or a Hawk.‡

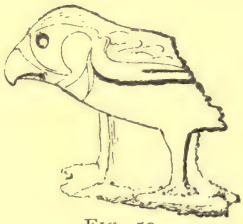


FIG 59.

C 38.

Nos. 1 to 14,§ are stone smoking-pipes.

Nos. 1, 𝔅, and 2, 𝔅, (S and D 644, 621), Fig. 60, represent

* 'Anc. Mon. Miss. Valley,' p. 266, fig. 178. Wilson, 'Prehistoric Man,' fig. 23.

† 'Anc. Mon. Miss. Valley,' fig. 171.

‡ Ibid., fig. 166.

§ S and D 644, 621, 681, 693, 680, 692, 679, 672, 678, fragments, 676, 673, 678, 674.

eagles or hawks each tearing a small bird to pieces.* The zigzag markings noticed at page 424 may be seen on both these hawks. No. 3, 𝔅, (S and D 681) Fig. 61, has the bowl in the

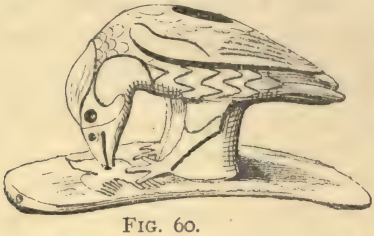


FIG. 60.

FIG. 61.

form of a small rodent, placed in a very graceful attitude† The pearl eyes of this specimen remain in the sockets, but in a calcined state. No. 4, 𝔅, (S and D 693) Fig. 62, represents the squirrel. No 5, 𝔇, (S and D 680) Fig. 63, the beaver.‡ Three figures of the beaver have been obtained from the mounds, all in the characteristic attitudes of that animal; the large head, blunt snout, small eyes and ears, and broad oval scaly tail, are all faithfully represented. No. 6, 𝔇, (S and D 692), Fig. 64, represents the head of the elk.§ This is one of the least faithful of the mound sculptures.

FIG. 62.

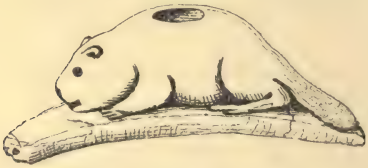


FIG. 63.

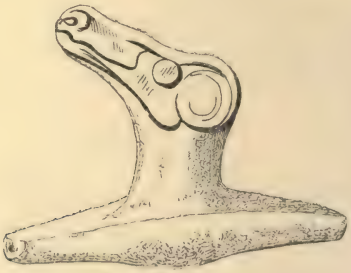


FIG. 64.

* 'Anc. Mon. Miss. Valley,' p. 259, fig. 165.
† Ibid., fig. 157.
‡ Ibid., fig. 155.
§ Ibid., fig. 161.

Nos 8, 𝔇, 13, 𝔇, and 14, 𝔅, (S and D 672, 678, 674) Figs. 65 and 66 (S and D 672 and 678) represent the Lamantin,* Manatee,† or Sea-Cow.‡ This animal is found in tropical regions. Seven sculptured figures of the Lamantin have been obtained from the mounds, of which three are nearly perfect. The external features of the animal are faithfully and minutely exhibited in the sculptures. There is

FIG. 65.

FIG. 66.

the truncated head, small and scarcely distinguishable eyes, thick semi-circular snout, peculiar nostrils, tumid furrowed upper lip, singular fins, and remarkable moustaches; § and yet these figures represent animals not met with on the spot, but found a thousand miles distant, upon the shores of Florida,

* *Manatus australis*, the Manatee. This is the Lamantin of Buffon; *Trichechus Manatus* of Linnæus; *Manatus Americanus* of Desmarest; Manate de l'Orenoque of Humboldt; Lamantin d' Amérique of Cuvier.

† Cuvier describes the Manatees as having vestiges of nails on the edges of their flippers. The five fingers of each flipper can be easily distinguished through the investing membranes, four of them being terminated by nails; these they use dexterously enough in creeping and carrying their young, a circumstance which has caused these organs to be compared to hands; hence the name, given to the animal, of Manati, or Manatee.

‡ 'Anc. Mon. Miss. Valley,' figs. 153, 154. Wilson, 'Prehistoric Man, fig. 22.

§ The mammæ of the Manatees are pectoral, and this conformation, joined to the adroit use of their flippers in progression, nursing their young, &c., has caused them, when seen at a distance with the anterior part of their body out of the water, to be taken for mermaids. There can be little doubt that not a few of the tales of Mermen and Mermaids have originated in the imperfect view which voyagers have obtained of these animals and of Seals and Walruses. The Portuguese and Spaniards give the Manatee a name which signifies Woman-Fish; and the Dutch call the Dugong Baardmannetje, or Little Bearded Man. A lively imagination alone was needed to complete the metamorphosis of this half woman or man, half fish, into a Siren, a Mermaid, or a Merman; and the wild recital of the voyager was treasured up by such writers as Maillet, Lachesnaye-des-Bois, Sachs, Valentyn, and others.

and even there only in small numbers.* The minute details are given with too much accuracy to allow us to believe that these pipes were made by any people who were not well acquainted with the animal and its habits.†

In one particular, however, the sculptors of the mound-period committed an error. Although the Lamantin is strictly herbivorous,‡ feeding chiefly upon sub-aqueous plants and littoral herbs; yet upon one of the stone smoking-pipes, Fig. 66, this animal is represented with a fish in its mouth.

FIG. 67.

No. 9, 𝔅, (S and D 678), Fig. 67, is perhaps intended for the walrus.§ The figure in this instance, and this instance only, is represented seated *across* the pipe; in every other case the animal-figures are so sculptured as to face the smoker.

C 39.

Nos. 1 to 13 ‖ are carved stone smoking-pipes. In the box No. 1 are three fragments of pipes representing the heads of animals, *a*, 𝔇, probably the racoon (S and D 695), Fig. 68; *b*, 𝔇, bear, (S and D 696), Fig. 69; and *c*, 𝔇, wolf (S and D 697), Fig. 70.¶

FIG. 68.

FIG. 69.

FIG. 70.

* The shallow bays of the Antilles and the quiet creeks of the South American rivers, particularly in Guiana and the Brazils, are the favourite haunts of the Manatee. They were formerly abundant at the mouths of the Orinoco and Amazon, ascending many miles, even into their tributaries and the fresh-water lakes.

† 'Anc. Mon. Miss. Valley,' pp. 251—254.

‡ Writing of the Lamantin, Bartram observes:—"My companions saw three of them at one time near this spring; they feed chiefly on aquatic grass and weeds." 'Travels in North America,' p. 299.

§ 'Anc. Mon. Miss. Valley, p. 271, fig. 192.

‖ S and D 696, 697, 695, 704, 708, 701, 706, 702, 705, 614, 616, 615, 613, 709.

¶ These sculptures are very incorrectly engraved in 'Anc. Mon. Miss. Valley,' figs. 189, 190.

Nos. 2 to 6, and No. 8 (S and D 704, 708, 701, 706, 705), represent the wild cat, and other animals of the same genus. See No. 3, 𝔅, Fig. 71,* No. 6, 𝔅, Fig. 72,† No. 8,‡ Fig. 73.§ No. 7, 𝔇, (S and D 702), Fig. 74, represents the wolf.

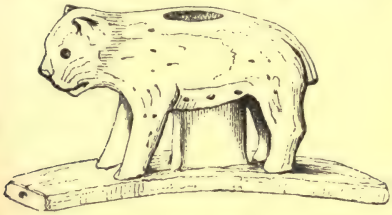


FIG. 71.

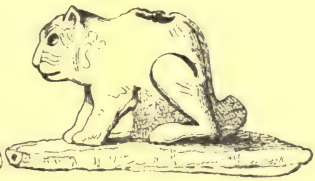


FIG. 72.

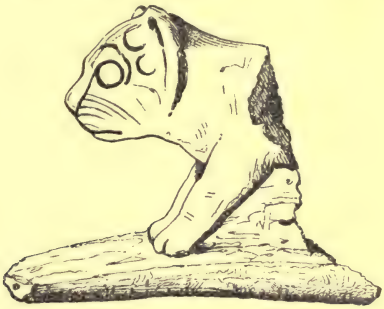


FIG. 73.

FIG. 74.

Few representations of the human head have been found in the mounds. Four were taken from the altar of Mound No. 8, "Mound City," three of which are bowls of smoking-pipes.

* 'Anc. Mon. Miss. Valley,' fig. 160.
† Ibid., fig. 159.
‡ This pipe is made of felstone.
§ 'Anc. Mon. Miss. Valley,' fig. 158.

No. 9 (S and D 614), Fig. 75,* is the cast of a smoking-pipe. The original, which is in the Collection of Mr. E. G. Squier, is of compact black stone; it differs from Nos. 10, 11, and 12 in having a greater hardness and severity of outline.

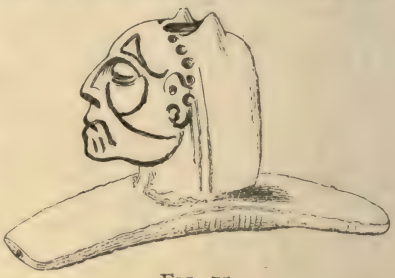


FIG. 75.

The figure wears "a singular head-dress, falling in a broad fold over the back of the head as far down as the middle of the neck. Upon each side of the top of the head, this head-dress rises into projections like horns. Encircling the forehead, and coming down as low as the ears, is a row of fifteen small round holes, placed as closely as possible together, some of which, when the head was found, were filled in part with pearls, completely calcined, and only recognisable from their concentric lamination. The holes were doubtless all originally filled in the same manner. Some ornamental lines are deeply cut upon the face. The mouth is compressed, and the brows are contracted, giving the countenance an aspect of severity.

No. 10, ⊞, (S and D 616), Figs. 76 and 77,† resembles No. 9 only in having the peculiar markings on the face.

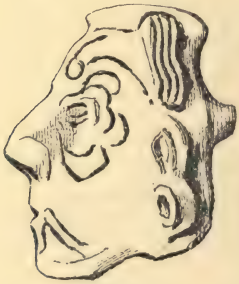


FIG. 76.

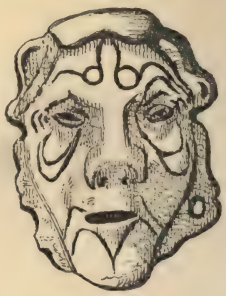


FIG. 77.

* 'Anc. Mon. Miss. Valley, pp. 243, 244, fig. 142.. This pipe is figured by Fairholt, 'Tobacco, its History and Associations;' but the engraving is very inaccurate. Fairholt also figured the human head No. 12, the lamantin, beaver, wild cat, and toucan pipes, but they are all incorrectly drawn.

† 'Anc. Mon. Miss. Valley,' pp 244, 245, fig. 143.

The features are bolder, and the outline of the face is quite different. The nose is large and prominent, the eyes are sunken and almost closed, the forehead is high and narrow. A portion of the hair appears to be gathered in festoons upon either side of the head above the ears; the remainder projects in a kind of knot from the back of the head. Upon the top of the head is a lappet or fold, which seems detached from the other parts of the head-dress, and simply rests upon the forehead. The ears are perforated; and, from the strongly attached oxide of copper around the holes, they were probably ornamented with rings of that metal. This head, unlike the others already described, has not formed part of a pipe. The material is a compact yellow limestone, very much altered by fire.

No. 11, 𝔅,* (S and D 615)† is made of the same variety of stone as No. 10. The features of this head are more regular than those of either of the preceding examples. The nose turns up slightly at the point, and the lips are prominent. The eyes seem closed, and the whole expression of the face is that of repose, perhaps of death. The head-dress is simple; and the ears, which are large, are each perforated with four small holes around their upper edges. At the lower and posterior portion of the head two holes are drilled, in convergent directions, each one-fifth of an inch in diameter, and half an inch in depth; were they continued one-fourth of an inch further in the same direction they would intersect each other. The head is destitute of markings upon the face. It has been suggested, from the greater delicacy of the features, that this specimen was intended to represent the head of a woman.

No. 12, 𝔅, (S and D 613), Fig. 78.‡ This is evidently intended to represent the head of a woman. It is carved from a compact stone, which is much altered by the action of fire. The muscles of the face are faithfully rendered, and the forehead is finely moulded. The eyes are prominent and open, and the lips are full and rounded. Whether the head is encased in a sort of hood, or whether the hair is platted across the forehead and down the sides of the face, it is not easy to determine. The knobs at the

* See pages 416, 417.

† 'Anc. Mon. Miss. Valley,' p. 245, fig. 144; Wilson, 'Prehistoric Man,' fig. 21.

‡ 'Anc. Mon. Miss. Valley,' pp. 245, 246, fig. 145. Wilson, 'Prehistoric Man,' pp. 463—469, figs. 19, 20.

top of the forehead and at the back of the ears may be either intended to represent the manner in which the hair was gathered or wound, or they may be ornaments attached to a head-dress.

FIG. 78.

These heads are valuable, as being the only examples obtained from the Ohio mounds. Upwards of a hundred miniature sculptures of animals were found associated with them, and the fidelity to nature observed in the latter fully warrants us in believing that the sculptures of the human heads are equally true to nature, and that they display, not only the characteristic features of the ancient mound-builders, but also their method of dressing the hair, the style of their head-dresses, and the character and mode of wearing some of their ornaments.

The markings upon the faces of two of these sculptures may be intended to represent lines of paint or some description of tattooing. We know that, among the North American tribes, the custom of painting the face with various colours, and of ornamenting it with fantastic figures, was widespread and common. The singular head-dresses of the mound-figures bear little resemblance to those of the present race of Indians, who usually only permit a single tuft of hair to grow, which hangs from the centre of the scalp; the hair of the women was allowed to fall loosely upon the shoulders, or was simply clubbed behind. Plumes of feathers, or the dried skins of the heads of certain animals, form their only kind of head-dress. The practice of wearing rings and pendants in the ears appears to have existed among the mound-builders; it is likewise almost universal among the Indians of North America and the Central American tribes.

These sculptures do not represent features essentially different from those of the great American family, the type of which seems to have been radically the same throughout the extent of the continent, excepting, perhaps, a few of the tribes inhabiting the extreme northern and southern regions.*

Mr. Lapham has remarked of the aborigines of America that: "The progress of discovery seems constantly to diminish the

* 'Anc. Mon. Miss. Valley,' pp. 243—247

distinction between the ancient and modern races; and it may not be very wide of the truth to assert that they were the same people." *

C 37.

Upon Tablets Nos. 25 and 26 are objects found, with the stone smoking-pipes already described, in Mound No. 8, "Mound City." Upon Tablet 25 *a* (S and D 32) are a number of copper beads molten together from the heat to which they have been exposed upon the "altar." Upon Tablet 25 *b* to *l* (S and D 33) are beads made of shell, coated with copper and then with silver. Silver has been found in very small quantities, and was evidently exceedingly rare among the mound-builders.† Professor Church has analysed one of the fused masses found in this mound, and writes thus:—"It contains ·19 per cent. of metallic silver, and ·45 per cent. of tin and antimony. Silver is found in American native copper, but only in the proportion of from ·03 to ·006 per cent.; the silver in the mound specimen analysed by me is probably due to a plating upon the copper. I do not think that tin ever occurs in native copper to the extent in which it is present in your specimen; usually it is entirely absent. The mass, however, is copper, not bronze." Upon Tablet 25, *m*, *n*, *o*, (S and D 17) are some star-shaped ornaments of shell, coated with copper.

Fig. 79.

Upon Tablet 26 (S and D 503) is a stone, ℂ,‡ "gorget." Fig. 79. This specimen has been much altered by heat; the circular striæ left by the drill in boring the hole can be distinctly seen.

Objects found in "Solitary Mound," near "Mound City." §

C 38.

Upon Tablets 16 to 20 are some copper armlets. Ten of

* 'Antiquities of Wisconsin,' p. 29.
† 'Anc. Mon. Miss. Valley,' p. 281.
‡ See page 416.
§ See pages 361, 362.

these armlets were found in this mound; they were placed in two heaps, five in each, and encircled some calcined bones—probably those of the arms upon which they had been worn.* They consist of a plain rod of copper hammered out, and so bent that the ends approach or lap over each other. They measure about two inches and a half in diameter, and weigh four ounces each.† The specimen *b*, on Tablet 20, shows that the metal was merely doubled over and hammered into shape. Some copper armlets found upon the arm-bone of a female skeleton, exhumed from a mound in Athens county, Ohio, are preserved in Dr. Hildreth's collection.‡ Simple rings of bent copper, the ends not united, were in general use with the North American tribes at, and prior to, the European conquest of the country.§

Five copper armlets were found in the upper chamber of the Grave Creek Mound.‖

Objects found in Mound No. 1, "Clark's Work."¶

Cases A 50, B 33, and E 6.

E 6.

Nos. 12, 𝔇, and 13, 𝔇, (S and D 690, 691) are two stone smoking-pipes, each having the figure of a snake coiled around the bowl; see Fig. 80.** These pipes when found were carefully enveloped in sheet mica and copper.

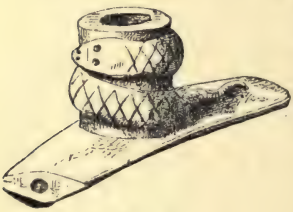


Fig. 80.

B 33.

Upon Tablet 1 (S and D 21) is part of a bone tube, the bore of which is *oval*, not circular. Upon Tablets 2 to 4 (S and D 40) are some pieces of bone orna-

* 'Anc. Mon Miss. Valley,' pp. 157.

† Ibid., pp. 204, 205, fig. 88.

‡ 'Proc. Amer. Antiq. Soc.,' No. 49, April 29, 1868, p. 46.

§ Schoolcraft, 'Archives of Aboriginal Knowledge,' vol. i., pp. 93—97, plate 31.

‖ These have been figured by Schoolcraft, in the 'Trans. Amer. Ethnol. Soc.,' vol. i., plate 2, fig. 9, pp. 400, 401.

¶ See page 364.

** 'Anc. Mon. Miss. Valley,' fig. 186.

mented with carving; the lines are sharply and delicately cut. Upon Tablets 5 and 6 (S and D 36 to 44) are some fossil sharks' teeth,* the specimen *c* on Tablet 6 has been drilled for suspension. Upon Tablets 7 to 10 (S and D, 28 to 34) are some reptilian teeth much injured by fire; the three specimens on Tablet 10 show human workmanship; *b* has been sawn, and *c* has been worked to a flat surface. Upon Tablet 11 *a* is a terra-cotta stamp representing a coiled rattlesnake; both faces of the tablet bear similar figures, one side, however, is plane, and the other slightly convex. This material is described by Squier and Davis as being a very fine-grained, cinnamon-coloured, sand-stone. The tablet is six inches and a quarter in length, one and three-eighths in breadth, and a quarter of an inch in thickness. The other tablets *b* and *c*, in this Case, when found were wrapped in thin plates of copper; they also were obtained from Mound No. 1, "Clark's Work." Altogether fragments of four tablets were found in this mound. Squier and Davis mention that they appear to have been painted of different colours; "a dark red pigment is yet plainly to be seen in the depressions of some of the fragments; others had been painted of a dense black colour."† No. 31, in Case A 50, is part of a stamp of terra-cotta found in another of the Ohio mounds. No. 32 in the same Case is an ideal restoration of the complete stamp. No. 37, Case A 50, is part of another terra-cotta stamp from a mound in Ohio.

Nos. 35 and 36, in Case A 50, are casts of the upper and under surfaces of a tablet found in a mound in the City plot of Cincinnati, associated with an inhumed skeleton, and some pointed bone implements, about seven inches in length, made from the tibia of the elk.‡ These objects appear to have been deposited with the primary interment, which was in the centre of the mound, and rather below the original level of the ground. Several secondary and superficial interments had taken place in this mound. The tablet is carved from a piece of fine-grained, compact, sandstone, of a light brown colour. It measures five inches in length, three inches in breadth at the ends, two and three-fifths at the middle, and is about half an inch in thickness. The sculptured surface varies very slightly from a perfect plane. The figures are cut in low

* 'Anc. Mon. Miss. Valley,' fig. 197.

† Ibid., pp. 276, 277, fig. 196.

‡ Ibid., p. 220, fig. 119.

relief (the lines being not more than one-twentieth of an inch in depth), and occupy a rectangular space four inches and one-fifth in length, by two and one-tenth in width. The sides of the stone are slightly concave. Diagonal lines, eight at one end and seven at the other, are drawn across the surface near the ends. Exterior to these are notches, twenty-five at one end, and twenty-four at the other. The back of the stone has three deep, longitudinal, grooves, and several depressions, evidently caused by rubbing—perhaps produced in sharpening the tool used for cutting the sculpture. This tablet was found by Mr. Guest, of Cincinnati, in December, 1841, and is preserved in his collection.

Another engraved block, of yellow sandstone, was found in one of the minor mounds of the Grave Creek flats.*

Stamps of burnt clay have been found in Mexico,† the faces of which are covered with figures in low relief; these, like the Ohio tablets, were probably used for impressing ornamental figures on skins or other articles of clothing.‡

Upon Tablets 12 and 13 (S and D 462, 463, 464) are discoïdal stones, highly polished. They are made of the material ℭ, described by Professor Church at page 416. Several delicately-carved objects of this material have been found in the neighbourhood; but objects carved from this variety of chlorite were not met with in any of the other mounds opened by Squier and Davis, with the exception of the "gorget" found in Mound No. 8, "Mound City."§ About thirty to forty of these discs were originally placed in this mound. It has been suggested that they were used in playing certain games, analogous to those known to have been practised by the North American tribes. The perfect polish of the edges of these specimens, however, weighs against this conclusion.‖ Stone discs which have probably been used in games will be described hereafter. The discs found in Mound No. 1, "Clark's Work," are circular, and vary in size and thickness. The

* 'Trans. Amer. Ethnol. Soc.,' vol. i. p. 400. Schoolcraft, 'Archives of Aboriginal Knowledge,' vol. i., p. 95, plate 29, figs. 1, 2.

† See page 338.

‡ 'Anc. Mon. Miss. Valley,' pp. 274—276, figs. 194, 195. The Cincinnati tablet has been described and figured in the 'Western Pioneer,' vol. ii, p. 195. Schoolcraft, 'Archives of Aboriginal Knowledge,' vol. i., p. 95, plate 23, fig. 5.

§ See page 435, fig. 79.

‖ 'Anc. Mon. Miss. Valley,' pp. 221, 222.

largest measures three inches and three-quarters in diameter, by one inch and one-tenth in thickness; the smallest two inches and eight-tenths in diameter, and nine-tenths in thickness. The others are of intermediate sizes; a few have their sides slightly convex, but the sides of most are perfectly straight. The pieces of worked stone upon Tablets 14 to 18* were also found in Mound No. 1, "Clark's Work."

Objects found in Mound No. 2, "Clark's Work."†

A 51.

Nos. 1 to 8 are chipped implements of sub-opaque flint obtained from this mound; they were placed side by side, a little inclining, one layer resting immediately upon the other, as shown in Fig. 37 *a a*, page 365. Upwards of six hundred of these implements were found, but the full extent to which the deposit reached on all sides was not ascertained. The flint of which the implements are made occurs in beds belonging to the Secondary formation; one of these, called "Flint Ridge," exists in the counties of Muskingum and Licking, Ohio. It extends for many miles, and numerous pits, from which the flint has been taken, occur throughout its entire length; these excavations are often ten or fifteen feet in depth, and occupy some acres in extent. It is probable that the recent as well as the more ancient races worked these quarries, just as they resorted to the celebrated quarry of the red-pipe-stone of the "Coteau des Prairies."‡

The flint objects, Nos. 1 to 8, closely resemble in form some of the flint implements found in the "drift" of England and France. No. 9 is a discoïdal flint implement, § from the gravel at Milford Hill, near Salisbury; it is very like the hornstone disc No. 6, from Ohio.

Flint discs, in type resembling these specimens, appear to have been used in Europe during both the Palæolithic and the Neolithic periods; and similar discs of quartzite have been found at Clermont, near Toulouse, France, associated with

* 14 *a* is of clay slate; 14 *b*, 15 *a* to *c*, 16 *a* to *d*, and 17 are the material ℭ; 18 *a* and *b* are perhaps of basalt-wacké.

† See page 365.

‡ 'Anc. Mon. Miss. Valley,' p. 158, fig. 46.

§ See page 41.

remains of *Felis spelœa*, *Elephas primigenius*, *Rhinoceros tichorhinus*, and *Megaceros Hibernicus*.*

The ovoïd flint implement, No. 5, agrees in type with No. 10, which was found in the drift at St. Acheul, valley of the Somme, France. Some of these Ohio flint implements have been figured, but the representations are not at all satisfactory.† Implements of drift-like types do not appear to occur very abundantly in North America, and those that have been found are either discs, heart-shaped, or of the oval and ovoïd forms; the pear-shaped and shoe-shaped types, met with in the drift of north-western Europe, seem not to have been found hitherto in the New World.‡

Several flint (hornstone) implements, found in Ohio, are preserved in the Collection of Mr. Charles Rau, of New York, who describes them as being "either roundish, oval, or heart-shaped, and of various sizes, but on an average six inches in length, four inches in width, and from three-quarters of an inch to an inch in thickness."§

A *deposit* of flint (hornstone) discs, thirty or forty in number, was found by some workmen in digging a ditch through a peat-swamp, near Racine. These discs varied from half a pound to a pound in weight, and were resting immediately upon the clay at the bottom of the peat, about two feet six inches below the surface.‖ A few of these implements are preserved in the Collection of the Smithsonian Institution.

Mr. Rau has given the following account of a third discovery of flint implements, of drift types, in North America:—

"About 1860, while I lived in St. Louis, a quantity of rudely-shaped flint objects of similar character (to those found near Racine) were discovered close together on the bank of the Mississippi, between St. Louis and Carondelet. It is probable that the falling down of a part of the bank had exposed them to sight. I could not ascertain their number, but saw about eight of them, of which I obtained three. They are nearly all of the same size, oval in shape, and consist of whitish flint."¶

* 'Matériaux pour l'Histoire de l'Homme,' 1866, vol. ii., pp. 42—46, figs. 8, 9.

† 'Anc. Mon. Miss. Valley,' fig. 104.

‡ See classification of Drift implements, pp. 40, 41.

§ C. Rau, 'A Deposit of Agricultural Flint Instruments,' reprinted from the 'Annual Report of the Smithsonian Institution,' 1868, p. 6.

‖ Lapham, 'Antiquities of Wisconsin,' pp. 8—10.

¶ Rau, *l.c.*, p. 7, fig. 4.

A figure of one of these implements, of the natural size, accompanies Mr. Rau's account, and is reproduced by Fig. 81. It is of an ovoïd form, more pointed at one end than at the other, and measures four inches and one-eighth in length, two inches and a quarter in breadth, and seven-eighths of an

FIG. 81.

inch in thickness in the middle. In form this implement is precisely like some which have been found in the drift of England and France. Mr. Rau, however, regards these implements as being in an unfinished state. He says :—

"It is evident that they are not implements in a state of completion, but roughly-edged fragments, which were destined to be made into arrow- and spear-heads at some future time.

Their present convenient shape was doubtless given them for the sake of easier transportation and for saving space. It is believed that flint can be chipped more readily after having been exposed for some time to the humid influence of the earth, and this may partly account for the practice of the aborigines of burying their supplies of flint in suitable places."*

This opinion coincides with that expressed of the Ohio flint discs by Squier and Davis, who were "wholly at a loss respecting their purpose, unless they were designed to be worked into the more elaborate implements, and were thus roughly *blocked out* for greater ease of transportation from the quarries." †

After alluding to the resemblance in form between these North American flint implements and the worked flints found in the drift of France, Mr. Rau adds, "Similarity in form, however, is the only analogy that can be claimed for the rude flint articles of both continents, considering that they occur under totally different circumstances. The drift implements of Europe represent the most primitive attempts of man in the art of working stone, while the Ohio discs are the unfinished implements of a race that constructed earthworks of amazing size, and was already highly skilled in the manufacture of weapons and tools of flint."

It is, therefore, granted by Mr. Rau that these flint discs *are* analogous in form to the drift implements of Europe; but, whilst there is no doubt that they occur under "totally different circumstances," and whilst admitting freely that no argument as to similarity of age can be founded upon mere similarity of form, the present writer cannot agree with Mr. Rau, that the American discs are necessarily, or even probably, unfinished implements. Mr. Rau appears to arrive at this conclusion from the circumstance that he cannot connect these objects with similar specimens found upon the surface soil of the country. He gives us no instance of the storing of such blocks by any modern savages, in order that the material might be chipped more readily from "having been exposed for some time to the humid influence of the earth." Unquestionably, flint *can* be flaked more readily when taken direct from the bed, and perhaps storing it in the manner suggested would serve to retain this property; but we are at present without any evidence that these deposits are stores of material, nor has it been shown that either the ancient or modern North

* Rau, *l.c.*, p. 7.

† 'Anc. Mon. Miss. Valley,' p. 214.

American tribes were accustomed thus to store flint. The fact, however, which appears to be fatal to the theory of Messrs. Squier and Davis and Mr. Rau is this, that the labour which has been expended upon the flint discs has absolutely unfitted them for the purpose suggested. Had it been intended to store *material*, we should have found squared or rough blocks. These would have presented the corners from which flakes, adapted for making into spear- and arrow-heads, could have been readily detached, whereas it would be almost impossible to detach a long flake from these American discs. Any person familiar with the process of knapping flint will readily understand this.

The flint implement, Fig. 81, found between St. Louis and Carondelet, has been brought into its present shape by a series of blows carefully measured as to their force, and all administered from the edges, as with the drift implements. The result has been that a strengthening mid-rib has been left, whilst the edge is thin and sharp; the surface, moreover, of the implement figured shows that seventeen flakes have been skilfully removed in order to *unfit* this disc for the purpose assigned to it by the American archæologists, and it is probable that the other surface of the implement would show that a similar number of flakes have been detached from that also. Had "ease of transport or saving of space" been the objects of the people who fashioned these discs, it is nearly impossible for them to have selected a form less adapted to the ends to be answered than that of an oval, thick in the middle and thin at the edges.

The legitimate conclusion at which we may at present arrive is—that implements, in form resembling some of the European palæolithic types, were made by the aborigines of America at a comparatively late period, and that the people usually termed the "Mound-builders," were, probably, the makers of these implements. It is worthy of note that no well-authenticated instance of the discovery of a rubbed stone-hatchet has yet been recorded, either in the palæolithic deposits of Europe or associated with *primary* interments in the Ohio mounds. Not only is this the case, but implements of neolithic types of all kinds are rarely found in the American mounds. Squier and Davis did not meet with more than three or four barbed stone arrow-heads in all the tumuli examined by them. The information which we at present possess does not warrant our laying too much stress upon this circumstance, but American archæologists are bestirring themselves with so much energy, that it is probable we shall not long be left without data of a

satisfactory nature upon this and other points, connected with the habits of the ancient stone-using races of the New World.

Mr. Rau considers that many of the flint implements, found in North America, have been used for agricultural purposes. He writes thus:—

"In an article published in the Smithsonian Report for 1863 I gave, for the first time, an account and drawings of certain North American flint implements of large size and superior workmanship, which were evidently used by the aborigines for cultivating the soil and other digging purposes, and hence, according to their shape, classified by me as *shovels* and *hoes*. I described the shovels as oval plates of flint, flat on one side and slightly convex on the other, the outline being chipped to a sharp edge. The specimen figured by me measures more than a foot in length, a little more than five inches in its greatest breadth, and about three-quarters of an inch in thickness in the middle. Others are narrower and not quite as heavy."*

The "hoes," judging by a figure given in Mr. Rau's paper, differ from the "shovels" in being relatively broader and shorter, and in having two deeply-worked notches at the sides towards the butt end, by which probably they were attached to the handle. The "hoe" engraved by Mr. Rau "is seven inches and a half in length, nearly six inches in width, and about half an inch in thickness in the middle. The rounded end is brought to a sharp edge. The material of which these implements are made is a peculiar kind of bluish gray or brownish flint, of slightly conchoïdal fracture, and capable of being split into large flat fragments. I never succeeded in discovering this stone *in situ*. The agricultural implements in my collection were all found in St. Clair county in southern Illinois, with the exception of one shovel, which was dug up, in 1861, in St. Louis, during the construction of some earthworks for the protection of the city. Both shovels and hoes were, doubtless, attached to handles, those of the latter probably forming a right, or even an acute, angle with the stone blade, which is always provided with two notches in the upper part to facilitate the fastening."†

"Some of the 'shovels' measure a foot and more in length, and consequently are among the largest flint tools hitherto discovered in any part of the world."

A specimen in the Blackmore Collection, No. 1, Case A 45, measures fourteen inches and a half in length, and five inches

* Rau, *l.c.*, p. 3.
† Ibid., p. 3.

and a quarter in breadth, and it probably was originally about an inch longer.

"That the North American flint tools described by me," says Mr. Rau, "were really used for digging can hardly be doubted. If the shape of these implements did not indicate their original use, the peculiar traces of wear which they exhibit would furnish almost conclusive evidence of the manner in which they have been employed; for that part with which the digging was done, notwithstanding the hardness of the material, is perfectly smooth, as if glazed, and slightly striated in the direction in which the implement penetrated the ground. This peculiar feature is common to all the specimens of this class in my collection, as well as to the few which I have seen in the hands of others; they seem to be rather scarce, and only occur in certain States bordering on the Mississippi river."*

A leaf-shaped implement of chert, six inches and a half in length, in Mr. Evans's collection at Nash Mills, found in Cayuga county, New York, shows the kind of wear mentioned very distinctly at the *broad* end. Several of these leaf-shaped implements are blunt and thick towards the narrow end, and show no wear except at the broad end. This is so with a leaf-shaped implement, upon Tablet 5 *a*, Case B 30, found in Canada by Mr. E. A. Gaviller of Ontario, by whom it was presented to the Collection. It only measures three inches and three-quarters in length, and one inch and three-quarters in width. In Case D 14, upon Tablet 33, is the cast of a leaf-shaped implement, of pinkish chert, now preserved in the British Museum. It was found at Abu Shahrein, in Southern Babylonia, and measures six inches and a half in length, three inches and a quarter in breadth, and is five-eighths of an inch in *thickness* at the narrow end, showing that this end could not have been employed for cutting or boring, but that the broad end was the part used.

Mr. Rau has given a detailed account of the discovery of a number of these flint "agricultural" implements in Southern Illinois.†

"In the early part of December, 1868, some labourers, while engaged in levelling an extension of Sixth Street in East St. Louis (formerly Illinois Town), St. Clare County, Illinois, came upon a deposit of Indian relics, consisting of flint tools, all of the hoe and shovel type, and about a bushel of small fossil

* Rau, *l.c.*, p. 4.
† Ibid., pp, 4—6.

marine shells, partly pierced, close to which were several boulders of flint and greenstone, weighing from fifteen to thirty pounds each, and many fragments of flint. The soil in the immediate neighbourhood is a black loam, overlying a stratum of a sandy character; the antiquities occurred in the latter bed. According to the contractor's statement, the flint tools, the shells, and the boulders were deposited in three separate holes dug in the sand, about a foot apart from each other, and placed like the corners of a triangle. To use his language, the implements formed a 'nest' by themselves, and so did the shells, and likewise the boulders. The flint tools, however, instead of being heaped together, like the shells and the boulders, were arranged edgeways, with some regularity, in a circular form, about seven or eight feet in diameter. The contractor neglected to count the implements, but he thinks there were from seventy to seventy-five in all; some fifty hoes and about twenty shovels. No other stone articles, such as arrow- and spear-heads, tomahawks, &c., were found with the agricultural implements. The specimens were soon taken away from the place by persons attracted by the novelty of the occurrence, and it is to be regretted that many, if not most of them, have fallen into the hands of individuals who are unable to appreciate their value. Dr. Patrick, of Belleville, Illinois, who visited the spot as soon as he heard of the discovery, examined upwards of twenty of the flint implements, and is of opinion that none of them had been used.

"The place of discovery lies about a mile and a half, or still farther, from the Mississippi, on elevated ground, and above ordinary high-water mark; but formerly, before the bed of the river was narrowed by the dyke connecting the Illinois shore with Bloody Island, the distance could not have been more than half a mile. The spot is situated nearly midway between two mounds, half a mile apart from each other.

"Several of the agricultural implements found at East St. Louis are now in my possession. Their material is a yellowish-brown variety of flint. In shape they resemble the tools of the same class previously described by me; most of the shovels, however, instead of having the end opposite the cutting part worked into a rounded edge, terminated in a more or less acute angle. The edges of all are chipped with the utmost regularity, and exhibit not the slightest wear, which proves that the implements were in a perfectly new condition when buried in the ground.

"The marine fossil shells are all small univalves, and belong almost entirely to the genus *Conovulus*. Of nearly three hundred specimens sent to me by Dr. Patrick, nineteen only are of other genera, namely, *Columbella*, *Marginella*, *Conus*, and *Bulla*. A number of the *Conovulus* shells are pierced with a hole in the lower part, which was sufficient for stringing them, as the connecting thread could easily be passed through the natural aperture of the shell. On close examination I found that these shells had been reduced, by grinding, to greater thinness at the place of perforation, in order to facilitate the process of piercing.

"The boulders, which formed a part of the deposit, were probably intended for the manufacture of implements. A piece of one of the boulders was sent to me for examination. It is a compact diorite, the material of which many ground implements of the North American Indians, such as tomahawks, chisels, pestles, &c., are made."

Objects found in Mound No. 5. "Clark's Work."*

E 6.

No. 26 (S. and D 43) is a marine shell *(Cassis)*, found in this mound. Neither this nor the shell *Pyrula perversa*, No. 25 (S and D 42), could have been obtained nearer than the Gulf of Mexico.† The inner whorls and columella have been removed from No. 26, perhaps to adapt it for use as a vessel; similar shells have been found in the vicinity of Nashville, from which the inner whorls have been removed so as to give place to an idol of clay. In the account given by Dr. Troost of some ancient remains found by him in Tennessee,‡ he mentions a large shell of *Cassis flammea*, the interior whorls and columella of which were all removed, so that nothing but the exterior shell remains. This is open in front, and in it was placed a rudely shaped idol in the form of a kneeling human figure, made of clay mixed with pounded shells.§ This shell, like Nos.

* See page 365.

† This specimen has been figured in the 'Anc. Mon Miss. Valley,' p. 283, fig. 198.

‡ 'Trans. Amer. Ethnol. Soc.,' vol. i., pp. 360, 361, vol. iii. pp. 360—364.

§ It is figured in 'Prehistoric Man,' vol. i. p. 218, fig. 9; the figure appears to be copied from an illustration in Dr. Troost's paper 'Trans. Amer. Ethnol. Soc.,' vol. i., p. 361.

25 and 26, must have been obtained from the tropics. It was ploughed up in the Sequatchy valley.

A large specimen of *Pyrula perversa* from which the interior whorls had been broken out, was found at Blue Spring, on the right bank of Lake Muroe, East Florida.*

The figure of a native is represented in one of the Mexican picture-writings,† carrying a large univalve shell in his left hand; in his right he holds a spear, toothed round the blade with flakes of obsidian.

Some of the North American Indian tribes entertain a superstitious reverence for sea shells, probably from their rarity. Thus the Omahas possess a sacred shell which is regarded as an object of great sanctity by the whole nation. It has been transmitted from generation to generation and its origin is unknown. A skin lodge is appropriated to it, and in this lodge a man, appointed as a guard to the shell, constantly resides. It is placed upon a stand, and is never suffered to touch the earth. It is concealed from sight by a number of mats, made of strips of skin plaited. The whole forms a large package, from which tobacco, and the roots of trees, and other objects are suspended. No one dares to open all these coverings in order to see the sacred shell. Three different persons' curiosity, according to tradition, has overcome their awe, and they have attempted to look upon the shell, but were punished with instant and total loss of sight. The last of these offenders, whose name is *Ish-ka-tappe*, is still living (1820). The shell is taken with the band to all the national hunts. Before any expedition is made against an enemy, the sacred shell is consulted as an oracle. The medicine men seat themselves around the sacred lodge, the lower part of which is thrown up like curtains, and the exterior mat is carefully removed from the shell, in order that it may receive air. Some of the tobacco, consecrated by being long suspended to the coverings of the shell, is taken by the medicine men, who fill their pipes with it and smoke to the Great Medicine. During this ceremony, every one listens most attentively in the hope of hearing a sound proceed from the shell. At length, some one imagines that he hears a noise, like that of a forced expiration of air from the lungs. This is

* Dr. Wyman, 'An Account of the Fresh-water Shell-heaps of the St. John's River, East Florida,' Salem Mass. 1868, p. 19; reprinted from the 'American Naturalist,' vol. ii. Nos. 8, 9.

† Kingsborough, 'Mexican Antiquities,' vol. i. plate 68.

considered as a favourable omen, and the tribe prepare for the expedition, confident of success. Should the shell obstinately remain silent the result of the expedition is regarded as doubtful.*

Objects found in Mound No. 9, "Clark's Work."†

Cases A 51 and B 33.

A 51.

In the glass dish No. 13 (S and D 733) are some pieces of charcoal which formed part of the layer met with in this mound.

The small bone implements upon Tablet 20 (S and D 20), Case B 33, were found in this mound,‡ as well as some narrow and thin slips of copper, and some pearl beads similar to those upon Tablet 4, Case B 34.

B 33.

Upon Tablets 22 to 26 (S and D 169 to 174) are fragments of obsidian spear-heads, fractured from the heat to which they have been exposed.§ Obsidian has not been found *in situ* nearer than Mexico; flakes, and arrow- and spear-heads, of obsidian have been obtained from five of the mounds, excavated by Squier and Davis, in the Scioto valley.‖ Some obsidian weapons have been discovered in the mounds of Tennessee.¶

Upon Tablets 27 to 30 (S and D 726) are thin sheets of mica, cut into scrolls, measuring six inches in length.** Upon Tablets 31 and 32 (S and D 726) are similar plates of mica, cut into circles two inches in diameter. These figures are shaped with the greatest precision; the edges are perfectly smooth, as if cut with a very sharp instrument; they do not exhibit the slightest irregularity, but are geometrically correct in outline. Each piece is perforated with small holes, such as could

* Long, 'Expedition from Pittsburgh to the Rocky Mountains,' Philadelphia, 1823, vol. i., pp. 325, 326.

† See page 366.

‡ The figures of these objects in the 'Anc. Mon. Miss. Valley,' p. 220, fig. 120, must be regarded as imaginary restorations.

§ 'Anc. Mon. Miss. Valley,' fig. 99, p. 211.

‖ 'Anc. Mon. Miss. Valley,' p. 285.

¶ 'Trans. Amer. Ethnol. Soc.,' vol. i, p. 361.

** 'Anc. Mon. Miss. Valley,' fig. 141, p. 240.

be produced with a blunt needle. These objects were probably used as ornaments to the dress. Humboldt mentions that the Guaynares of the Rio Caura, in South America, are accustomed to stain themselves with arnotto,* and to make broad transverse stripes on the body with some unctuous substance, on which they stick spangles of silvery mica.†

Many of the American mounds contained mica, sometimes in plates of considerable thickness, but usually in thin sheets with ragged outlines; like the specimens in Case E 6.‡

About one hundred and fifty plates of mica, an inch and a half or two inches in diameter, each perforated with two or more small holes, were found in the Grave Creek Mound. § These plates were about the thickness of writing paper, and it has been suggested that they were attached together, forming a kind of scarf.

Upwards of twenty oval plates of mica were found in a mound near Lower Sandusky, Ohio, each plate being perforated with a small hole at one end. ‖

Mica does not occur *in situ* in the State of Ohio, but is supposed to have been obtained from the southern heights of the Alleghanies. ¶

Traces of spun thread and woven cloth were observed in Mound No. 9, "Clark's Work."

Objects found in Mound *c—e*, Liberty Township, Ross County, Ohio. **

A 51.

No. 11 (S and D 9) is a thin plate of copper, about eight inches in length and four in breadth, perforated with two holes. †† This is one of the so-called "gorgets." These ornaments are frequently found, but usually with inhumed burials; the stone "gorget," Fig. 79, page 435, however, was found in one of the

* Arnotto (*Annatto*). A pasty colouring matter obtained from the seed-pulp of the *Bixa Orellana*.

† 'Pers. Narration,' ch. xxiv.

‡ 'Anc. Mon. Miss. Valley,' pp. 240, 241.

§ Page 370.

‖ 'Anc. Mon. Miss. Valley,' pp. 240, 241.

¶ Schoolcraft, in 'Trans. Amer. Ethnol. Soc.,' vol. i., p. 400.

** Pages 367, 368.

†† 'Anc. Mon. Miss. Valley,' fig. 89, p. 205.

"altar" mounds, and is much injured by the heat to which it has been exposed. Copper "gorgets" are generally about the thickness of ordinary sheet copper, and are usually perforated with two holes, placed at equal distances from the ends, and somewhat above the longitudinal centre. This circumstance, and the fact that they are almost always found with skeletons, has led to the idea that they were personal ornaments, perhaps worn suspended around the neck, resting upon the breast. There is one circumstance, however, that seems inconsistent with this conclusion, namely, that none of the holes exhibit the slightest elongation from wear. On the contrary, their edges are as sharp as if newly cut. Such would scarcely have been the case with articles of this soft material, and of such thinness, had they been suspended in the manner suggested. The holes in the little silver crosses, found in the graves of the modern Indians, are frequently worn so much as to be nearly a fourth of an inch in length; and yet they weigh less than half an ounce, and are cut out of thicker plates of metal than the copper "gorgets." Either the "gorgets," if used for the purpose suggested, were worn only on extraordinay occasions, or they were suspended in such a manner that there was an absence of friction at the holes.

Ribaulde, who visited the shores of Florida, in 1562, speaks of a chief who "had hanging about his neck a round plate of red copper well polished, with one other lesser one of silver in the midst of it, and at his ear a little plate of copper, wherewith they used to stripe the swete from theyer bodyes." Sir Walter Raleigh mentions that the tribes with which he held communication on the shores of North Carolina wore copper plates on their heads, which were badges of authority, and distinguished the chiefs. These plates were so highly polished that they were at first mistaken for gold. It is not impossible that the specimens found in the mounds were worn in a like manner by the ancient people. No. 11 was found in chamber *a*, beneath the head of the skeleton with which it was buried.* In the same chamber was the pipe, No. 12 (S and D 590), Fig. 19.† The tool marks are plainly to be seen upon this specimen.‡

No. 15 (S and D 10), Case C 38, is a "gorget," consisting of

* 'Anc. Mon. Miss. Valley,' p. 205, fig. 89.

† Page 352.

‡ 'Anc. Mon. Miss. Valley,' p. 179, fig. 68.

a thin plate of hammered copper, with one hole near the centre; it was found in a mound near "Clark's Work." *

Objects found in Mound No. 1, Plate 2, "Ancient Monuments of the Mississippi Valley." †

In this mound a number of canine teeth of animals drilled for suspension were found.‡ Such specimens can be seen upon Tablets 8 to 11, Case B 34, all of which were obtained from the mounds opened by Squier and Davis. Among them are teeth of the wild cat, wolf, and bear.§

Beads made from human teeth ground down have been discovered; and pendants made of perforated bears' teeth are common.‖

Some modern necklaces of canine teeth are shown, in Cases D 4 and D 5, for illustration.

In "Mound No. 1, Plate 2," a number of shell and bone beads were also found, such as those upon Tablets 26 and 28, Case B 34.

Objects found in Mound No. 3, Plate 2, "Ancient Monuments Mississippi Valley."¶

A 50.

No. 6 is the only wedge-shaped stone hatchet, obtained by Squier and Davis from either of the mounds of Ohio, which the discoverers consider can be assigned to the period of the mound-builders. The present writer has expressed an opinion that No. 6 is probably not of the period of the mound-builders.**

* 'Anc. Mon. Miss. Valley,' p. 199, fig. 84.

† Page 368.

‡ In a 'Catalogue of the Rarities belonging to the Royal Society,' by 'Nehemjah Grew, M.D., F.R.S.,' 1681, is a description of "a string of Virginian money. A row of teeth in shape like the fore-teeth of a hare: all woven together, at one end, with brown twisted thread, into one piece ¼ of a yard long."—P. 370.

§ 'Anc. Mon. Miss. Valley,' p. 234, fig. 131.

‖ Schoolcraft, 'Archives of Aboriginal Knowledge,' vol. i., p. 104, plate xxiv., figs. 25, 26, and plate xxv., figs. 26, 27, and 28.

¶ See page 369.

** See page 370. The hatchet has been figured in the 'Anc. Mon. Miss. Valley,' p. 217, fig. 110.

Grave Creek Mound.

A 50.

Nos. 33 and 34 are casts of the upper and under surface of the celebrated "Grave Creek" Tablet, said to have been found under the circumstances already mentioned.*

Mr. Schoolcraft, who has especially studied this relic, finally concludes, after corresponding with many American and European archæologists, that of the twenty-two letters upon the tablet, four resemble ancient Greek characters, four are like Etruscan, five like the old Northern Runes, six like ancient Gaelic, seven resemble old Erse, ten are like Phœnician, fourteen like Anglo-Saxon, and sixteen like Celtiberic; besides which, other equivalents may possibly be found in old Hebrew.† A stone of such doubtful character could prove little under any circumstances; but it must also be mentioned, that Dr. James W. Clemens communicated to Dr. Morton all the details of the exploration of the Grave Creek Mound, without making any reference to the discovery of the inscribed stone. Nor was it until the objects obtained from this Mound were exhibited by the proprietor to all who cared to pay for seeing them, that the marvellous inscription came opportunely to light to add to the attractions of the show.‡

B 34.

Upon Tablets 1 to 3 are shells pierced for suspension. Upon Tablets 4 to 7, and 26 to 28, are shell-beads. The specimens *b*, *c*, *d*, and *e*, Tablet 1, are shells of the *Dentalium*. These shells and shell-beads have all been found in various tumuli in Ohio.

* See page 370. This specimen has been described in many publications: 'Cincinnati Chronicle,' Feb. 2, 1841; 'American Pioneer,' vol. ii., No. 5; 'Académie des Inscriptions et Belles Lettres,' 1845; 'Memoires Roy. Soc. Northern Antiq.,' Copenhagen, 1840, 1843.

† Schoolcraft, 'Trans. Amer. Ethnol. Soc., vol. i., pp. 384—397. 'Archives of Aboriginal Knowledge,' vol. i., pp. 124—128, plate 38, figs. 1, 2.

‡ Wilson, 'Prehistoric Man,' vol. ii., pp. 180—182, fig. 49. Lubbock, 'Prehistoric Times,' pp. 226, 227. Squier, 'Aboriginal Monuments of the Miss. Valley.' 'Trans. Amer. Ethnol. Soc., vol. 2, pp. 199—207.

Sea-shells in their natural state, or made into beads, were highly valued by most of the North American Indian tribes, and were frequently worn by them as amulets. The *Venus mercenaria* was thus prized, and various articles of ornament, having a sacred import, were made from these shells. It was perhaps on account of their value as amulets that marine shells and shell-beads were so frequently buried in the tumuli; for the Indian futurity is not a place of rest, and the hunter's soul during its uneasy wanderings has still occasion for the protecting power of the charm.* Marine shells, of the genera *Marginella*, *Oliva*, and *Natica*, pierced for suspension, have been found in many of the American mounds. Shell-beads have been found in mounds in Western New York; on the plains of Sandusky, near Buffalo, and north of the Niagara river in Canada.†

The shells found in the Grave Creek Mound are all of one species of *Marginella*, which is found on the coast of Florida and in the West Indies.‡

Shell-beads, moreover, under the name of *wampum*, represented the first aboriginal idea of an arbitrary standard of value among the North American Indians.

Wampum.

It is probable that primitive wampum was made of small shells; but the wampum in use among the Indians when they were first brought into contact with Europeans, consisted of shell-beads, purple and white, about a quarter of an inch in length, and an eighth of an inch in diameter, perforated lengthways, for convenience in stringing them. The white beads were chiefly made from the sea-conch, and the purple from the mussel-shell. The term "wampum"§ is said to be derived from a word in the Algonkin languages signifying *white*, the

* Schoolcraft, 'Archives of Aboriginal Knowledge,' vol. 1, pp. 90, 91.

† Ibid., vol. 1, p. 85.

‡ Schoolcraft, 'Observations on the Grave Creek Mound,' in 'Trans. Amer. Ethnol. Soc.,' pp. 397, 398, fig 5, plate 1.

§ "And there the fallen chief is laid,
In tassell'd garb of skins arrayed
And girdled with his *wampum* braid."
Whittier—'The Funeral Tree.'

colour of the more common variety of shell beads. "Their white money they call *wompam*, which signifies white; their black, *suckanhock*, or *sucki*, meaning black."*

Wampum was known under many other names; it was called *wampumpeage*,† *wampeage*, *peage*, *wampumpeak*,‡ *peak*,§ *seawan* or *seawant*,‖ and *ronoak*.¶ We are told that:—"On the Virginia coast is found that species of conch shell of which the Indian *peak* is made. The extremities of these shells are blue, the rest being white, so that *peak* of both these colours are drilled out of the same shell, serving the natives both for ornament and money, and are esteemed by them beyond gold and silver."**

The Rev. Cotton Mather, writing of the Massachusetts Indians, says:—"Know, then, that these doleful creatures are

* R. Williams, 'Key to the Indian Language,' quoted in Bartlett's 'Dictionary of Americanisms,' p. 500.

† "A Sagamore, with a humbird in his eare for a pendant, a black hawk on his occiput for a plume, good store of *wampumpeage* begirting his loines, his bow in hand, his quiver on his back, with six naked Indian spatterlashes at his heels for his guard, thinks he is all one with King Charles." Wood's 'New England,' 1634, p. 66. See also Baylies' 'New Plymouth,' p. 37. In 'A Catalogue of the Rarities belonging to the Royal Soc. and preserved in Gresham Colledge,' by 'Nehemjah Grew, M.D., F.R.S., &c., London, 1681,' the following passage occurs, at page 370:—"Several sorts of Indian money, called *Wampampeage*. 'Tis made of a sort of shell, formed into small cylinders, about $\frac{1}{4}$ of an inch long, $\frac{1}{8}$ over, or somewhat more or less; and so being bored, as Beads, and put upon strings, pass among the Indians, in their usual commerse, as silver and gold amongst us. But being loose is not so currant." I am indebted to Mr. H. J. F. Swayne for the loan of the above work, and for bringing the passage to my notice.—E. T. S.

‡ "Though the young Indian women are said to prostitute their bodies for *wampumpeak* and other such fineries, I could never find any ground for the accusation." Beverley's 'Virginia,' 1705. Book III.

§ "The Indians (of Virginia) have nothing which they reckoned riches before the English went among them, except *peak*, *roenoke*, and such trifles, made out of the conk shell." Beverley's 'Virginia.'

‖ "The speaking now ceased, and they gave each of us ten fathoms of *seewan*, which is their money, each fathom being worth four guilders." De Vries 'New Netherlands.' "A quantity of Dutch commodities was purchased on this occasion by the New Plymouth people; especially *seawan* or *wampum*, which the English found to be afterwards very beneficial in their trade with the natives." O'Callaghan, 'History of New Netherlands,' p. 108.

¶ "The current money of all the Indians in Carolina, and, I believe, of all over the continent as far as the Bay of Mexico, is that which we call *peak* and *ronoak*. This is that which they in New York call *wampum*." Lawson's 'Carolina,' 1718.

** 'Westover Papers,' p. 12.

the verriest ruins of mankind . . . these abject creatures live in a country full of mines . . . but our shiftless Indians were never owners of so much as a knife till we came among them. Their name for an Englishman is a knife-man; stone was used instead of metal for their tools; for their coins they have only little beads with holes in them to string them upon a bracelet, whereof some are white, and of these there go six for a penny. Some are black, or blue, and of these go three for a penny. This wampum, as they call it, is made of the shell-fish, which lies upon the sea-coast continually." *

Schoolcraft says that, about 1640, three beads of blue wampum, and six of white, were equal to a styver, or to one penny English.

Roger Williams, in his description of the wampum in use by the New England Indians (1628) says:—"It is of two kinds—white, which they make of the stem of the periwinkle, after all the shell is broken off. Of this kind, six of the small beads—which they make with holes to string upon their bracelets—are current with the English for a penny. The other kind is black, inclining to a blue shade, which is made of the shell of a fish, which some of the English call *henspoquahock;* and of this description three are equal to an English penny. One fathom of this stringed money is worth five shillings."

From a 'Catalogue of the Natural and Artificial Rarities belonging to the Royal Society,' published in 1681,† we learn that, of the several varieties of *wampampeage*, "the meanest is in *single strings*. Of which, here is both the White and Black. By measure, the former goes at five shillings the fathome; the latter at ten. By number, the former at six a penny; the latter at three. The next in value is that which is woven together into *bracelets* about ¾ of a yard long; black and white, in stripes, and six pieces in a row; the warp consisting of leathern thongs, the woofe of thread. These bracelets the *Zanksquaes* or Gentlewomen commonly wear twice or thrice about their wrists. The best, is woven into *girdles*. Of this, here are two sorts. One about a yard long; with fourteen pieces in a row, woven, for the most part, into black and white squares, continu'd obliquely from edge to edge. The other, not

* Quoted by Schoolcraft, 'Archives of Aboriginal Knowledge,' vol. I., p. 284.

† 'Made by Nehemjah Grew M.D. Fellow of the Royal Society, and of the Colledge of Physitians,' p. 390.

all-out so long, but with fifteen pieces in a row. Woven into black rhombs or diamond-squares, and crosses within them. The spaces between filled up with white. These two last, are sometimes worn as their richest ornaments ; but chiefly used in great payments, esteemed their noblest presents, and laid up as their treasure."

By the laws of Rhode Island, in 1648, it was enacted that "no one shall take any black *peage* of the Indians but at foure a penny ; and if any shall take black *peage* under foure a penny, he shall forfeitt sayd *peage*, one-halfe to the informer, and the other halfe to the State."*

We can readily understand the scarcity of any standard of value in the earlier days of the European colonisation of America, when we find that, about the middle of the seventeenth century, the General Court of Massachusetts passed a law that musket balls of a full bore should pass currently for a farthing each, but that no man should be compelled to take more than to the value of twelvepence of them at any one time.† For a very considerable period wampum continued to represent money in North America. Thus, in 1640, owing to the failure of the crops in the preceding year, the General Court of Massachusetts ordered "That white *waumpumpeage* should be current at four for a penny, and the black two for a penny, no one being compelled to take more than twelvepence in them at a time." In 1641, the authorities farmed out the wampum as well as the fur trade to a company. For this privilege, the company were to pay into the Colonial Treasury one-twentieth of all their peltry, and were also to purchase whatever wampum was received by Harvard College, provided it did not exceed 25*l.* in value at any one time. In 1648, the General Court of Massachusetts made the following law:—"It is ordered for trial till the next court that all payable or passable *peage* henceforth shall be entire, without breaches, both the white and black without defacing spots, suitably strung in eight known parcels of the following denominations or value, viz.: 1d., 3d.,

* Quoted in Bartlett's 'Dict. of Americanisms,' p. 313

† The following singular mode of payment of a debt appears on record, the 20th June, 1672:—"Whereas *Awashunckes*, squa-sachem, stands indebted vnto Mr John Almey the sume of £25, to be paid in porke att three pence a pound, or peage att 16 peney, & 20 pole of stone wall at £4, which stone wall, or £4, is to be vnderstood to be prte of the fiue and twenty pounds &c &c &c."—See Drake, 'Book of the Indians,' p. 250.

12d., and five shillings in white; and 2d., 6d., two shillings and sixpence, and ten shillings in black." The court also ordered that *waumpumpeage* should pass current in the payment of debts, to the value of forty shillings—the white at eight for a penny, and the black at four, if they be entire and without breaches and defacing spots, except in payment of "country rates" to the Treasurer—the Government evidently not desiring the accumulation of shell-money in the Treasury.* Wampum, however, was received as tribute from the Indians, and we find that, about 1650, Ninigret paid the English in two years about 1100 fathoms of this shell-money. †

An old writer (John Josselyn) ‡ asserted that the Indians made wampum so cunningly, "that neither Jew nor devil" could counterfeit it. As events turned out, this was an idle boast, for a spurious imitation, very closely resembling real wampum, was introduced by the fur traders at so low a price, that the whole Indian country was soon flooded with it, destroying at once the value and meaning of real wampum.

Even as a decoration, however, wampum was of value, for we find that, about 1671, Pometacom, a New England Indian, possessed a coat, band, and leggings "thick set with these beads, in pleasant wild works." This brave suit was valued at 20*l.* §

Catlin noticed that, after he had passed the Mississippi river, scarcely any wampum was used. He did not observe it at all among the Upper Missouri Indians, very little among the Missouri Sioux; the tribes north and west of them did not use it. Below the Sioux, and along the whole western frontier of the United States, the use of wampum was profuse. ‖

The Shoshonees were accustomed to wear collars of sea-shells procured from tribes to the south-west. ¶

Some of the Kiawa, Kaskaskia, Arapaha, and Shienne Indians, wear, suspended from the slits in their ears, the highly-prized

* M. W. Dickeson, 'The American Numismatic Manual,' Philadelphia, 1860, pp. 44—48, plate v.

† See Drake, 'Book of the Indians,' Boston, 1857, pp. 135—137. In 1647, fifteen fathoms of wampum, paid by the Narragansets, were valued at £4 4s. 6d., or 5s. 7⅜d. a fathom.

‡ 'Account of Two Voyages to New England,' pp. 142, 143.

§ E. T. Stevens, 'On the Dentalium Shell and Shell-money' in the 'Technologist,' vol. v., pp. 356, 357. Drake, 'Book of the Indians,' p 229.

‖ Catlin, 'North American Indians,' vol. 1, pp. 222, 223, *note.*

¶ Lewis and Clarke, p. 315.

nacre of a marine shell, brought probably from the north-west coast.*

The Pimo Indians wear long strings of sea-shells or parts of shells. These are highly prized, the owners, even when disposed to part with them, asking five dollars, or a pair of blankets, for a few strings.†

The pre-historic races of the Old World, in like manner, appear to have regarded sea-shells as objects of value. In a barrow in Dorsetshire, a cowrie shell was found, which was perforated, and appeared to have been used as a bead.‡ Canon Greenwell found the skeleton of a woman, in a tumulus, on Langton Wold; in front of the waist were laid a jet bead, two sea-shells pierced for suspension, three cowrie shells unpierced, and some other objects.§

In 1838, an elevated knoll, in the Phœnix Park, Dublin, known as Knock Maraidhe, or the Hill of the Mariners, was levelled. In doing which it was discovered that it was an artificially formed mound, and had been raised over an interment; within it was found a chamber of unhewn stone, containing two male skeletons, and immediately under each skull lay a quantity of the common littoral shells (*Nerita littoralis*). These had been rubbed down on the valve, so as to make a second hole, for the purpose of enabling them to be strung together to form necklaces, and the remains of vegetable fibre were discovered along with them, a portion of which was actually through the holes in the shells.‖

Probably the tropical marine shells which have been found in American tumuli, at considerable distances from their native habitat, had been treasured by their owners during life for their rarity, and were buried with the cherished belongings of the deceased.

Perhaps they, as well as shell-beads or wampum, represented money. Certain marine shells are even now highly prized in

* Long, 'Expedition from Pittsburg to the Rocky Mountains,' Philadelphia, 1823, vol. ii., p. 182.

† Bartlett, 'Explorations in Texas, &c.,' New York, 1854, vol. ii., p. 231.

‡ 'Archæologia,' xxx., p. 330.

§ 'Pro. Geol. and Polytechnic Soc. West R. Yorkshire,' 1867, p. 539.

‖ A small fibula of bone and a knife or arrow-head of flint, were found with these remains, but no objects made of metal. Wilde. 'Cat. Mus. Roy. Irish Acad.,' pp. 181—183, figs 131—133. 'Proceedings Roy. Irish Acad.,' vol. i., pp. 186—190. Wilson, 'Prehistoric Man,' vol. i., pp. 193, 194.

Central Africa. Shinte hung a string of beads with the end of a *cone-shell* around Dr. Livingstone's neck, as a last and convincing proof of his friendship. Two such shells would have purchased a slave, and five would have been a handsome price for an elephant's tusk worth 10*l.**

With the North American Indian, however, wampum was not only a medium of exchange and a favourite and valuable decoration, it was also used, like the *quipu*, as an aid to the memory, and by means of it records were kept and treaties were ratified.†

The germs of a possible native civilisation among the Indian tribes of North America are naturally to be sought for in that remarkable League of the Iroquois, by which the conquests of France were so effectually arrested to the south of the St. Lawrence; and among the members of that League the wampum belt was in use for all their most sacred and important records. By means of the wampum the laws of the League were recorded, and every contract or treaty was defined and guaranteed. The white and purple wampum was strung upon thongs, and formed into belts as broad as one's hand, and about two feet in length. "These they call belts, and give and receive at their treaties as the seals of their friendship."‡

One singularly interesting example of the use of wampum as the evidence and sole title-deed of an extensive transfer of land was preserved in England until quite recently by Mr. Granville John Penn, a descendant of William Penn; and is now in the collection of the Historical Society of Philadelphia. It is the belt of wampum, delivered by the Lenni-Lenape sachems to the founder of Pennsylvania, at "the Great Treaty," under the elm-tree at Shackamaxon, in 1682. After having been handed down for generations in the founder's family, it was presented to the Historical Society of Philadelphia, in 1857. It is composed of eighteen strings of wampum, formed of white and black beads worked upon leather thongs, and the whole is made into a belt twenty-eight inches in length and five and a half inches in breadth. The ground is of white beads, the pattern consists of three diagonal stripes of black beads, and in the centre Penn is represented taking the hand of the Indian

* 'Prehistoric Man,' vol. i., pp. 206, 207.

† Schoolcraft, 'Archives of Aboriginal Knowledge,' vol. i., p. 90.

‡ Hubbard. 'Narrative, Indians in New England,' p. 40. Quoted by Wilson, 'Prehistoric Man,' vol. ii., p. 149.

sachem, the former being the larger figure of the two. These figures are worked in black beads.*

In 1675, the famous war of the New England chief, Metacomet, better known as King Philip, broke out. When at length Philip had fallen, and the hostile tribes were almost exterminated, Annawon, an aged chief, approached Captain Church, the leader of the colonists, and thus addressed him:—"Great captain, you have killed Philip, and conquered his country. I and my company are the last that war against the English. You have ended the war, and therefore these belong to you." He then handed to him two broad belts elaborately worked in wampum, "edged with red hair from the Mohawk's country."† One of them reached from the shoulders nearly to the ground. It was the Magna Charta of the New England tribes, who had fought their last fight.

The original Wampum of the Iroquois, in which the laws of the League were recorded, is described by Mr. Lewis H. Morgan in his history of the League, as being made of spiral fresh-water shells, which were strung on deer-skin strings or sinews, and the strands braided into belts, or simply united into strings. His account of the mode of using these wampum belts will illustrate the close analogies they present to the *quipus*. In describing the great councils of the League, he says:—"The laws explained at different stages of the ceremonial were repeated from strings of wampum, into which *they had been talked* at the time of their enactment. In the Indian method of expressing the idea, the string or the belt can tell, by means of an interpreter, the exact law or transaction of which it was made, at the time, the sole evidence. It operated upon the principle of association, and thus sought to give fidelity to the memory. These strings and belts were the only visible records of the Iroquois, and were of no use except by the aid of those special personages who could draw forth the secret records locked up in their remembrance."‡ There was, accordingly, a sachem specially appointed as "Keeper of the Wampum." Verbal promises, interchanged either among themselves or with foreign tribes, were regarded as of little moment if no strings or

* This wampum belt is figured, the size of the original, in the 'Memoirs of the His. Soc. of Pennsylvania,' vol. vi. An impression of this print may be seen by applying to the attendant at the Blackmore Museum.

† "These belts, it is believed, remain, at this day, the property of a family in Swansey."—Drake, 'Book of the Indians,' p. 239.

‡ 'League of the Iroquois,' p. 120.

belts had been employed to ratify them and secure their remembrance. Sir William Johnson mentions, as the result of his experience :—"They regard no message or invitation, be it of what consequence it will, unless attended or confirmed by strings or belts of wampum, which they look upon as we our letters, or rather bonds."*

Among the Iroquois, wampum beads were rarely worn as ornaments. They were used chiefly for religious purposes, and to preserve the remembrance of laws and treaties. The white wampum was generally employed for religious purposes, and the black usually for political matters.

After war had been declared, the circumstance was made known by placing a tomahawk, painted red, ornamented with red feathers and black wampum, in the war-post in each village of the League.†

At the sacrifice of the "White Dog" a string of white wampum was hung around its neck.‡ The idea of the sacrifice of the "White Dog" was to send up the spirit of the dog as a messenger to the Great Spirit, to announce the continued attachment of the tribe to his service. The fidelity of the dog was emblematical of their fidelity. They used the spirit of the dog as they did the incense of tobacco; through both of these means they sought to commune with the Great Spirit.

A full string of wampum was about three feet in length, and contained a dozen or more strands. In ancient times, six of these strands were regarded as being of the value of a human life, and were accordingly paid in condonation for a murder. When sold, wampum was counted and reckoned at half a cent a bead.§

The use of the wampum belt, as a means of recording an event, is well illustrated by a speech made, about 1742, by the Onondaga chief, Canasatego, to the Delawares. These people had sold some of their lands without the knowledge or consent of the Iroquois. "Let this belt of wampum," said Canasatego, "serve to chastise you . . . how came you to take upon you to sell land at all? We conquered you; we made women of you . . and you can no more sell land than women. . .

* Letter of Sir W. Johnson, 1753, in 'Documents relating to Colonial His. of New York,' vol. ii., p. 624.

† 'League of the Iroquois,' p. 339.

‡ Ibid., p. 217.

§ Ibid., pp. 387, 388.

We therefore assign you two places to go, either to Wyoming or Shamokin. . . Don't deliberate, but remove, and take this belt of wampum." Then taking another belt he continued :—"This string of wampum serves to forbid you, your children, and your grandchildren to the latest posterity from ever meddling in land affairs. . . . For which purpose you are to preserve this string, in memory of what your uncles have this day given you in charge."*

The ratification of a treaty by the gift of wampum was regarded as solemn and binding, and any infringement of such an engagement was considered to be highly disgraceful and infamous, and, when possible, was severely punished.

After the *Sag-a-na'-gä*, or Delawares, had been subdued, and had acknowledged their dependence by sending the tributary wampum, they made an inroad upon a western nation under the protection of the Iroquois, notwithstanding their knowledge of the treaty, and a prohibition against its infringement. A deputation of Iroquois chiefs went immediately into the country of the Delawares, and having assembled the people in council, they degraded them from the rank of even a tributary nation. Having reproved them for their want of faith, they forbade them from ever after going out to war, divested them of all civil powers, and declared that they should henceforth be as women. This degradation they signified in the figurative way of putting upon them the *Gä-kä-ah*, or woman's skirt, and placed in their hands a corn-pounder, thus showing that their business ever after should be that of women. The Delawares never emancipated themselves from this act of denationalization.†

Even a religious pledge was not considered to be binding unless the wampum was used. Among the Iroquois the first festival of the spring was called *O-tä-de-none'-ne-o na wä'-ta*, or "Thanks to the maple." It was an act of thankfulness to the Great Spirit for the gift of the maple. Some days before the festival took place the people assembled and openly acknowledged their faults; this meeting was called *Sa-nun-dät-ha-wä'-tä*, literally "a meeting for repentance." One of the chiefs took a string of white wampum in his hand, and set the example by confessing his own faults, after which he handed the string to the one nearest to him, who received it, made his own confession in like manner, and passed it to another. In this way

* Colden, 'Hist. Five Nations,' Lond. Ed. 1750, pp. 80, 81.

† 'League of the Iroquois,' p. 338.

the wampum went around from hand to hand. Old and young, men, women, and children, all united in this public acknowledgment of their faults. On some occasions the string of wampum was placed in the centre of the group, and each Indian advanced to perform the duty, as the inclination seized him. A confession and promise of amendment without holding the wampum was not regarded as binding. It was the wampum which recorded their words, and gave their pledge of sincerity.*

When the celebrated "Cornplanter," *Gy-ant'-wä-ka*, selected his successor, he sent him his tomahawk and a belt of wampum, to announce his resolution and his wishes.†

It has been suggested that the presence of three or four thousand shell-beads in some of the American tumuli, as in the Grave Creek Mound, may be all that is left of a wampum belt which chronicled the deeds of the illustrious dead,‡ and it is highly probable that this was so; still shell-beads are profusely used by some modern savages simply for ornamental purposes, as may be seen by the specimens from the Salomon and Kingsmills Islands and New Guinea in case D 7.

It is highly probable that the nations of America had not developed for themselves anything corresponding to an alphabet. The art of picture-writing, which the North American tribes§ shared with the Aztecs, was supplemented among the former by the use of the wampum belt.

* 'League of the Iroquois,' pp 187, 188.

† 'Ibid.,' p. 215, *note.*

‡ Wilson. 'Prehistoric Man,' vol. ii., pp. 146—153.

§ The North American tribes do not appear to have used phonetic picture-writing, as did the Aztecs, who wrote the name of King Itzcoatl, or "Knife-Snake," in two ways. In the "Tellier Codex" the name is represented by the picture of a snake with stone knives upon its back, but in the "Vergara Codex" the picture consists of a weapon armed with blades of obsidian, *itz* (tli), the first syllable; the rest of the word is not represented by a snake, *coatl*, but by an earthen pot, *co* (mitl), and above it the sign of water, *a* (tl). Here we have real phonetic writing, for the name is not to be read, according to sense, "knife-kettle-water," but only according to the sound of the Aztec words, Itz-co-atl. In the "Mendoza Codex" the name of a place pictured by a fishing-net and teeth is interpreted Matlatlan—that is, "Net-Place." Now *matla* (tl) means a net, and so far the name is a picture; but the teeth, *tlan* (tli), are used, not pictorially but phonetically, for *tlan*, place. There is no sufficient reason to make us doubt that this purely phonetic writing was of native Mexican origin, and after the Spanish Conquest it was turned to account in a new and curious way, for the Indians substituted Aztec words as near as might be in sound to the Latin words in the prayers of their new faith. The beginning of a Paternoster, in the metropolitan library of Mexico, is made with a

The wampum belt bears so close a resemblance to the *quipu* of the Peruvians, that, when an ancient *quipu* was found at Tlascala, both M'Culloch and Prescott rejected the inference drawn from it, that the ancient Mexicans were acquainted with the *quipu*, alleging that the object in question was nothing more than a wampum belt. Prescott, indeed, assumes that the ancient Peruvians were ignorant of picture-writing,* but Humboldt appears to prove that they were acquainted with the method of expressing ideas by means of symbolic paintings in addition to their *quipus*.†

The *quipu* consists of a cord with knots tied in it, for the purpose of recalling or suggesting something to the mind. When a person ties a knot in his handkerchief, he makes a rudimentary *quipu*. Darius made one when he took a thong and tied sixty knots in it, and gave it to the chiefs of the Ionians, that they might untie a knot each day, until all the knots were undone, when, if he had not returned, they might go back to their own land.‡ Such was the string on which Le Boo tied a knot for each ship he met on his voyage, to keep in mind its name and country; and that one on which his father, Abba Thulle, tied first thirty knots, and then six more, to remember that Captain Wilson was to come back in thirty moons, or at least in six beyond.§

Acosta mentions that he saw a woman with a handful of knotted strings of diverse colours, which she said contained a general history of her life.‖ This reminds one of the picture-writing upon the buffalo-robe of *Mah-to-toh-pa*, the second chief of the Mandans, which had the history of all his battles painted upon it.¶

flag, *pa* (ntli), a stone, *te* (tl), a prickly pear, *noch* (tli), and again a stone, *te* (tl), which would read Pa-te noch-te, or perhaps Pa-tetl noch-tetl. M. Aubin may be considered as the discoverer of these phonetic signs in the Mexican pictures, or at least he is the first who has worked them out systematically and published a list of them. Aubin in 'Revue Orientale et Américaine,' vols. iii.—v. Brasseur, 'Hist. des Nat. Civ. du Mexique et de l'Amérique Centrale,' Paris, 1857—9, vol. i. Quoted by Tylor, 'Early Hist. of Mankind,' pp. 93—97.

* 'Conquest of Peru,' vol. i., ch iv., p. 115.

† Humboldt, 'Researches,' London, 1814, vol. i., p. 174; vol. ii., p. 221.

‡ Herod., iv. 98. See Plin., x., 34.

§ Keate, 'Pelew Islands,' London, 1788, pp. 367, 392.

‖ See Wilson, 'Prehistoric Man,' vol. ii., p. 146.

¶ Catlin, 'North American Indians,' vol. i., pp. 145—154. The entire robe is figured, plate 65, and the details are given upon a larger scale in the three following plates.

The *quipu* is so simple a device that it may have been invented again and again, and its appearance in several countries does not prove it to have been transmitted from one country to another. It has been found in Asia,* in Africa,† perhaps in Mexico; under the form of the wampum belt, it existed among the North American Indians;‡ but its greatest development was undoubtedly in South America.§ The word *quipu*—that is, "knot," belongs to the language of Peru, and *quipus* served there as the regular means of record and communication for a highly-organised society. Von Tschudi describes the *quipu* as consisting of a thick main cord, with thinner cords tied on to it at certain distances, in which the knots are tied. The length of the *quipus* varied much, the main trunk being often many ells in length, sometimes only a single foot; the branches were seldom more than two feet, and usually much less. Von Tschudi dug up a *quipu* which weighed about eight pounds.‖ The cords were often of various colours, each with its own proper meaning; red for soldiers or war, yellow for gold and what it symbolises, white for silver or peace, green for maize or agriculture, and so on. This knot-writing was especially suited for reckonings and statistical tables; a single knot meant ten, a double one a hundred, a triple one a thousand, two singles side by side twenty, two doubles two hundred. The distances of the knots from the main cord were of great importance, as was the sequence of the branches, for the principal objects were placed on the first branches and near the trunk, and so in decreasing order. This art of reckoning, continues Von Tschudi, is still in use among the herdsmen of the Puna (the high mountain plateau of Peru), and he had it explained to him by them, so that with a little trouble he could read any of their *quipus*. On the first branch they usually register the bulls, on the second the cows, these again they divide into milch-cows and those that were dry; the next branches contain the calves,

* Erman (E. Tr.), London, 1848, vol. i., p. 492.

† Goguet, vol. i., pp. 161, 212. Klemm, C.G., vol. i., p. 3. Bastian, vol. i., p. 412.

‡ Charlevoix, vol. vi., p. 151. Long's Exp., vol. i., p. 235. Talbot, 'Disc. of Lederer,' p. 4.

§ Humboldt and Boupland, vol. iii., p. 20. See Prescott, 'Conquest of Peru,' vol. i., pp. 112—116.

‖ A part of this specimen is figured. Tylor, 'Early Hist. of Mankind,' p. 156, fig. 15. An ancient Peruvian *quipu* is engraved in Kingsborough's 'Anc. Mexico,' vol iv.

according to age and sex, then the sheep in several subdivisions, the number of foxes killed, the quantity of salt used, and, lastly, the particulars of the cattle that have died. On other *quipus* is set down the produce of the herd in milk, cheese, wool, &c. Each heading is indicated by a special colour or a differently twined knot.

It was in the same way that in old times the army registers were kept; on one cord the slingers were set down, on another the spearmen, on a third those with clubs, &c., with their officers, and thus also the accounts of battles were drawn up. In each town were special functionaries, whose duty it was to tie and interpret the *quipus;* these persons were called *Quipucamayocuna*, or "Knot-officers." By constant practice, they so far perfected the system as to be able to register with their knots the most important events of the kingdom, and to set down the laws and ordinances. In modern times, all the attempts made to read the ancient *quipus* have been in vain. The difficulty in deciphering them is very great, since every knot indicates an idea, and a number of intermediate notions are left out.*

Quipus are found in the Eastern Archipelago and in Polynesia proper;† they were in use in Hawaii, about forty years ago, in a form apparently not inferior to the most elaborate Peruvian examples. "The tax-gatherers, though they can neither read nor write, keep very exact accounts of the articles of all kinds collected from the inhabitants throughout the island. This is done principally by one man, and the register is nothing more than a line of cordage from four to five hundred fathoms in length. Distinct portions of this are allotted to the various districts, which are known from one another by knots, loops, and tufts, of different shapes, sizes, and colours. Each taxpayer in the district has his part in this string, and the number of dollars, hogs, dogs, pieces of sandal-wood, quantity of taro, &c., at which he is rated, is well defined by means of marks of the above kind, most ingeniously diversified."‡

It is singular that we seem able to trace back the germs of so many inventions to China. Thus, in the times of Yung-ching-che, it is related that people used little cords marked by different knots, which, by their numbers and distances, served them

* J. J. V. Tschudi, 'Peru,' St. Gall, 1846, vol. ii., p. 383. Quoted by Tylor, 'Early Hist. of Mankind,' pp. 155—158.

† Marsden, p. 192. Keate. Klemm, C.G., vol. iv., p. 396.

‡ Tyerman and Bennet 'Journal,' London, 1831, vol. i., p. 455. Quoted by Tylor, *l.c.*, p. 158.

instead of writing. The invention is ascribed to the Emperor Suy-jin, the Prometheus of China.* Setting aside names and dates, this story embodies the assertion that in old times the Chinese used *quipus* for records, till they were superseded by the art of writing.†

This has been the fate of the *quipu* everywhere. Even the picture-writing of the ancient Mexicans appears to have been strong enough to supplant it.‡

Shells of the Dentalium.

B 34.

Perhaps no shell has been more prized by the North American Indians than that of the *Dentalium.*

Upon Tablet 1, *b*, *c*, *d*, and *e*, are examples of this shell found in the Ohio mounds. These were probably obtained by barter from the tribes on the north-west coast, and indeed may have passed from tribe to tribe at an enhanced value in proportion to the distance they were carried from their original habitat. These shells are still highly valued by the Indian tribes on both sides of the Rocky Mountains. In Case D 6, upon Tablet 11, is part of a necklace of *Dentalia*, which was taken from the body of *Shaw-hōn-taen*, or *Dull Knife*,§ the great medicine man of the Cheyenne Indians, who was killed at Forsyth's fight, on the

* Gouguet, vol. iii., p. 322. De Mailla, 'Histoire Gén. de la Chine,' Paris, 1777, vol. i., p. 4. Quoted by Tylor, 'Early Hist. of Mankind,' p. 154.

† 'Early Hist. Mankind,' p. 154.

‡ Mr. Tylor remarks of the quipu, "Whether its use in Mexico is mentioned by any old chronicler or not, I do not know; but Boturini placed the fact beyond doubt by not only finding some specimens in Tlascala, but also recording their Mexican name, *nepohualtzitzin* (Boturini, 'Idea de una nueva Historia,' &c.; Madrid, 1746, p. 85), a word derived from the verb *tlapohua*, "to count."

§ *Dull Knife* was described by the Scouts by whom he was killed as being thin-faced and advanced in years, but of most desperate courage. He was the foremost of the 700 Indians who attacked Colonel Forsyth and his forty-eight Scouts. During the ten days they were besieged the Americans were compelled to subsist wholly upon the flesh of their mules and horses. The specimen upon Tablet 11 is only one-half of the necklace; it was given to Mr. Blackmore by the Scout who took it from the body of *Dull Knife.* He divided it before Mr. Blackmore could prevent his doing so; the other half is still in his possession as a memento of the battle.

dry fork of the Republican river, between Fort Sedgwick and Fort Hayes, Kansas, 17th to 28th September, 1868.

The Chinooks and other Indians of the Northern Pacific coast wear long strings of *Dentalia* as necklaces, and as fringes to their robes.

The *Dentalium* shells vary from about an inch and a-half to upwards of two inches in length. They are white, conical, slightly curved in form, and taper to a point. "A great trade is carried on among all the tribes in the neighbourhood of Vancouver's Island through the medium of these shells. They are valuable in proportion to their length, and their value increases according to a fixed ratio, forty shells being the standard number required to extend a fathom's length. A fathom thus tested is equal in value to a beaver's skin; but if shells can be found so far in excess of the ordinary standard that thirty-nine are long enough to make the fathom, 'it is worth two beavers' skins,' if thirty-eight, three beavers' skins, and so on, increasing in value one beaver skin for every shell less than the standard number."*

Mr. Lord has given the following account of the *Dentalium* currency of the north-west coast, and of the mode of taking the shells:—

"It is somewhat curious that these shells should have been employed as money by the Indians of North-West America—that is, by the native tribes inhabiting Vancouver's Island, Queen Charlotte's Island, and the mainland coast from the Straits of Fuca to Sitka. Since the introduction of blankets by the Hudson's Bay Company the use of these shells, as a medium of purchase, has to a great extent died out, the blankets having become the money, as it were, or the means by which everything is now reckoned and paid for by the savage. A slave, a canoe, or a squaw, is worth in these days so many blankets, but they used to be valued at so many strings of *Dentalia*. In the interior, east of the Cascade Mountains, the beaver skin is the article by which everything is reckoned—in fact, the beaver skin is the money of the inland Indians.

"The value of the *Dentalium* depends upon its length; those representing the greater value are called, when strung together end to end, a 'Hi-qua;' but the standard by which the *Dentalium* is calculated to be fit for a 'Hi-qua' is, that twenty-

* Mr. Paul Kane, quoted by Wilson, 'Prehistoric Man,' vol. i., p. 192.

five shells placed end to end must make a fathom, or six feet in length. At one time a 'Hi-qua' would purchase a male slave, equal in value to fifty blankets, or about £50 sterling. The shorter and defective shells are strung together in various lengths, and are called 'kop-kops.' About forty 'kop-kops' equal a 'Hi-qua' in value. These strings of *Dentalia* are usually the stakes for which the Indians gamble.

"The shells are generally procured from the west side of Vancouver's Island, and towards its northern end; they live in the soft sand in the snug bays and harbours that abound along the west coast of the island, in water from three to five fathoms in depth. The habit of the *Dentalium* is to bury itself in the sand, the small end of the shell being invariably downwards, and the large end close to the surface, thus allowing the mollusc to protrude its feeding and breathing organs. This position the wily savage has turned to good account, and has adopted a most ingenious mode of capturing the much-prized shell. He provides himself with a long spear, the haft made of light deal, to the end of which is fastened a strip of wood placed transversely, and full of inserted teeth made of bone, resembling exactly a comb with the teeth very wide apart.

"A squaw sits in the stem of the canoe and paddles it slowly along, whilst the Indian with the spear stands in the bow. From time to time he stabs the comb-like affair into the sand at the bottom of the water, and after giving two or three stabs draws it up to look at it; if he has been successful, perhaps four or five *Dentalia* have been impaled on the teeth of this spear. It is a very ingenious mode of procuring these shells, for it would be quite impracticable either to dredge or net them out, and they are never, as far as I know, found between tide-marks.

"At one period, perhaps a remote one, in the history of the inland Indians, these *Dentalia* were worn as ornaments. I have often found them mixed with stone beads and small bits of the nacre of the *Haliotis*, of an irregular shape, but with a small hole drilled through each piece, in the old graves about Walla-walla and Colville. In all probability these ornaments were obtained by barter from the coast Indians; but as these graves are quite a thousand miles from the sea, it is clear the inland and coast Indians must have had some means of communication."*

* J. K. Lord, 'Naturalist in British Columbia,' vol. ii., pp. 25, 26.

The Indians of the Columbia were accustomed to wear the *Dentalium* shell passed through the cartilage of the nose.*

Dentalia were used for a necklace by some long-forgotten warrior, who found his last resting-place in a tumulus at Winterborne Stoke, near Salisbury. With the mouldering remains of their former owner were found a bronze dagger-blade, some imperfectly burnt clay-beads, two joints of a fossil encrinite, and several shells of the *Dentalium.*† From this and similar instances it would appear that necklaces and ornaments were habitually worn by *men* in the British Isles during the Stone and the Bronze periods, precisely as is the case with modern savages. The warrior is more frequently loaded with feathers, beads, and knick-knacks than the squaw.

Between the years 1820 and 1835, a curious trade was carried on from Monterey in the shells of the Aulone. The traders in Monterey, or those who resorted there in whaleships, used to buy these shells and take them to the Sandwich Islands, for sale to the merchants. They were then shipped to Oregon, Vancouver, and Russian America, to exchange for peltries and articles with the coast Indians. The Indians would give a sea-otter's tail for one aulone shell. These tails were afterwards sold in China for from seven to ten dollars each. More to the north, in Russian America, the Indians would give an elk's skin for three aulone shells. These elks' skins, which are very large, and preserved by the Indians with smoke, could be exchanged with the Coast people still farther to the north for a sea-otter's skin of the largest kind, worth in China from one hundred to one hundred and fifty dollars.‡

The aulone shells were also taken by the beaver trappers and mountain traders, as a medium of exchange, from Monterey into the Sierra Nevada, and even the Rocky Mountains, and were bartered with the Indians for furs, horses, buffalo robes, and other valuables at high prices. The Indians converted them into buttons, and strung them, in number from one to two hundred, on deer's sinews. A string of them was of great value, for they were produced with immense labour. It took an Indian twelve months to make a string. They were broken up, or cut with obsidian into small pieces; each piece was then made into the form of a button by grinding, and a hole was

* Lewis and Clarke, *l.c.*, p. 439.

† Hoare, 'Hist. Anc. Wiltshire,' vol. i., pp. 113, 114, plate xiii.

‡ 'The California Farmer,' Dec. 5, 1862.

bored through it. The possession of several of these strings conferred immense wealth and power on the owner, for they were not only valued as money, but were regarded in the light of amulets, or *medicine*. The use of these shells extended to California, Oregon, Vancouver, and the North-west coast, and they were often the cause of bloody and thieving wars. Even to this day the aulone is an important article of Indian trade.*

The cowrie currency of Asia and Africa is analogous to the wampum and dentalium currency of America.

Cowrie shells (*Cypræa moneta*) are procured on the coast of Congo, and in the Philippine and Maldive Islands. They constitute, indeed, the chief article of export from the latter. At what remote date, or at what early stage of rudimentary civilisation this shell-currency was introduced, it is perhaps vain to inquire, but the extensive area over which it has long been employed tends to prove its antiquity. The Philippine Islands form, in part, the eastern boundary of the Southern Pacific, and the Maldives lie off the Malabar coast in the Indian Ocean; but their native shells circulate as currency, not only through Southern Asia, but far into the African continent.†

The cowrie was used in the East Indies, and particularly at Calcutta, as money. It has been stated that one hundred tons of cowries were annually shipped from England alone to Guinea; these were originally imported from the Maldive Islands to Bengal, and from Bengal into England.

In Bengal 80 cowries made a *poni*, and 60 or 65 *ponies*, according to the supply, were equal in value to a rupee. In the interior of Africa the value of the cowrie was increased tenfold.‡

Like the dentalium or wampum, cowries were valued for ornamental purposes as well as from their furnishing a medium of exchange. Several modern objects in the Collection are decorated with cowries, and in particular a sword, upon the top of Case E 15, has a string of these shells attached to the handle. A visitor to the Museum, not long since, being anxious to give his wife the benefit of his ethnological knowledge, directed her attention to these specimens by pointing out that they were "the teeth of enemies slain in battle."

* (A. S. T., 'Wide West,' January, 1857.) 'The California Farmer,' December 5, 1862.

† Wilson, 'Prehistoric Man,' vol. i., p. 191.

‡ Rees' 'Cyclopædia.'

Trade beads appear to have taken the place to some extent of the dentalium on the north-west coast of America. The great object of the Indians of the Columbia river is to obtain beads, an article which holds the first place in their ideas of relative value. Not only are beads prized as ornaments; they are a medium of trade with Indians still higher up the river, and these Indians again use them in trading with the Indians of the Rocky Mountains.* Lewis and Clarke resolved to ascertain the ideas entertained by the Indians (Clatsops) of the Columbia river of the relative value of different objects. Accordingly they were offered, for the skin of a sea-otter, a watch, a handkerchief, an American dollar, and a bunch of red beads; they, however, refused them all, and asked for *tiacomoshack*, or "Chief beads," the most common sort of coarse blue-coloured beads, the article beyond all price in their estimation.†

In another passage Lewis and Clarke say:—"Blue beads are called *tiacomoshack*, or "Chief beads"; they hold the first value in the eyes of the natives on the Columbia, but even the inferior beads are esteemed beyond the finest wampum; indeed, beads are the great circulating medium of trade on the Columbia.‡ They are also the favourite decoration of the Indians of the Columbia, who bind them very tightly round their wrists and ankles, to the width of three or four inches; they frequently wear them in large loose rolls round the neck; as ear ornaments; or hanging from the nose."§

Much curious information might be brought together respecting the use of trade beads in the Old World as well as in America; but, as the present work has already greatly exceeded the limits originally assigned to it, a few remarks must suffice.

In Africa there has been a frequent change of fashion with regard to beads. The same kind of beads which found a market one year along one part of the coast would probably not be saleable there the next. At one time the green were preferred to the yellow, at another the opaque to the transparent, and at another the oval to the round, whilst each district had its own peculiar fancy and taste, differing wholly from that of the adjoining districts.¶

* Lewis and Clarke, *l.c.*, p. 382.
† Ibid., pp. 403—410, 411.
‡ Ibid., p. 446.
§ Ibid., p. 439.
¶ Rees' 'Cyclopædia.'

The present writer is informed that what are known as "Popo" beads are dug up in certain places in Africa. These are the relics of ancient traffic, for imitations of them do not appear to be used by the modern traders, although the "Popo" beads are very highly prized by the natives,* and are even reputed to be worth their weight in gold.†

Some of the opaque beads, called "agras," which are exchanged for oil, ivory, and gold, at Accra, Lagos, and Cape Coast Castle, show a remarkable adherence to a special type, for they are said to be "copies of ancient beads" reputed to have been used at a remote period in carrying on this particular traffic.‡

The flat "agras" are perforated discs, measuring about five-eighths of an inch in diameter, and about a quarter of an inch in thickness. They are used in the slave trade on the west coast of Africa. The slave beads used by the Portuguese and Spaniards on the same coast are globular, opaque glass beads, some measuring as much as an inch in diameter. Others are six-sided tubes of opaque white glass, rather more than two inches in length. "Olives" are used in the palm oil trade at Bonny, &c.; they are ovoïd beads, some of which are of transparent glass. Certain of them appear to be imitations of amber and jet beads. The larger specimens are about an inch and a quarter in length, and five-eighths of an inch in diameter. The smaller specimens do not measure more than half an inch in length. "Colliers" are globular glass beads, ranging from three-quarters of an inch to about three-eighths of an inch in diameter. They are used in the ostrich feather and ivory trade on the south coast of Africa.§

* Ancient glass beads found, under similar circumstances, by the peasantry in Ireland, are still regarded as possessing a talismanic power, and are sometimes called "gloine-an-druidh," or the "magician's glass." See a paper upon 'Anc. Personal Ornaments of Glass found in Ireland,' by Robert Day, Jun., in the 'Journ. of the Hist. and Archæol. Association of Ireland,' No. 6, April, 1869. Glass ornaments, very similar to the ancient examples figured by Mr. Day, are still worn by the peasantry of Lower Britanny. I have seen them exposed for sale at Carnac. Twelve or fourteen, of different patterns, are strung upon a wire, and placed in a glass bottle; a customer makes her selection, the particular bead is removed from the wire, the end of which is then bent back to prevent the unsold beads from slipping off.—E. T. S.

† This information has been given me by Mr. A. Hutton, of Liverpool, through the Rev. F. Bennett.—E. T. S.

‡ Mr. Levin, of London, has supplied me with specimens of these "agras" and the other varieties of trade beads still in use.—E. T. S.

§ Closely connected with this subject is the use, in barter, of pen-annular rings

A 49.

No. 1 (S and D 492). — Tube of whetslate, found in a mound close to Chillicothe, the interment in which had been by cremation. The tube is thirteen inches in length, by one and one-tenth in diameter; one end swells slightly, and the other terminates in a broad, flattened, triangular "mouth-piece." It is drilled throughout; the bore is seven-tenths of an inch in diameter at the cylindrical end of the tube, and retains that size until it reaches the point of union with the mouth-piece, when it contracts gradually to one-tenth of an inch at the end. The inner surface of the tube is perfectly smooth, till within a short distance of the point of contraction. For the remaining distance the circular striæ, formed by the drill in boring, are distinctly marked. This specimen has been figured.* One end of the tube is slightly discoloured from the heat to which it had been exposed.

Nos. 2 to 3 (S and D 490), are parts of lime-stone tubes. No. 2. (S and D 490) was found in a burial-mound, near Chillicothe.† No. 4 (S and D 491), is part of a tube of whetslate. Several stone tubes similar to No. 1 were found in some tumuli, near the celebrated Grave Creek Mound.‡ A quarry of whetslate occurs on the banks of Grave Creek, about four or five miles above the great mound.§

In the collection of the American Antiquarian Society, at

of copper, which were made chiefly at Bristol, and are known as "manillas." These "manillas" are in form like the ancient bronze armillæ found in Ireland and other countries, and the modern armillæ in present use in Africa. Copper and brass rods are now exported instead of "manillas." During the years 1836, 1837, and 1838, large quantities of *cast-iron* "manillas," in imitation of those of copper, were made at Birmingham, and exported from Liverpool to Africa. The manufacture of these *cast-iron* "manillas" has been discontinued since the year 1838, in consequence of the natives of Africa refusing to give anything in exchange for them. More than 250 tons of these imitations. however, were made in Birmingham and the neighbourhood, in the year 1838, for the African market. See 'Notes and Queries,' 1st series, vol. vii., p. 533; vol. viii., p. 278.

* 'Anc. Mon. Miss. Valley,' pp. 224, 225, fig. 122.

† Mound No. 2, plate xx., 'Anc. Mon. Miss. Valley.'

‡ Some of these have been figured by Schoolcraft, 'Archives of Aboriginal Knowledge,' vol i., plate xxxii., figs. 5—12, p. 97. For an account of the Grave Creek Mound, see *ante* page 370.

§ Schoolcraft, 'Observations respecting the Grave Creek Mound,' in Trans. Amer. Ethnol. Soc.,' vol. i., p. 406.

Boston, there is a polished stone tube fourteen inches in length, and one inch and a-half in diameter, with a bore diminishing from an inch at one end to a quarter of an inch at the other. It was found four feet beneath the surface, on the South Ridge, thirty-eight miles and a-half from Lake Erie, and was presented to the Collection by Mr. Jacob French, Painesville, Ohio.*

It is difficult to assign a purpose to these stone tubes. Vanegas says that the "medicine men" of the Californian Indians use tubes of stone in the cure of diseases. "They applied to the suffering part of the patient's body the *chacuaco*, a tube formed out of very hard black stone, and through this they sometimes sucked, and at other times blew, but both as hard as they were able, supposing that the disease was either exhaled or dispersed."†

Stone "Gorgets."

A 49.

Nos. 14 to 33‡ are stone "gorgets." Nos. 17, 29, and 32 are from Alabama. The locality of No. 26 was not given; the remainder are from Ohio. The figures show the principal types of these objects; No. 14 (S and D 496) Fig. 82;§ No. 15 (S and D 497) Fig. 83; No. 23 (S and D 502) Fig. 84; No. 30 (S and D 507), Fig. 85;‖ No. 25 (S and D 504) Fig. 86;¶ No. 28 (S and D 500) Fig. 87;** No. 29 (S and D 506) Fig. 88.††

It will be observed that the perforations in the "gorgets" have been made, in some instances, with a tool made upon the principle of a modern centre-bit; for the drilling was effected by a central point, which did not project from the base

* 'Proceedings Amer. Antiquarian Soc.,' No. 49, April 29, 1868, p. 47.

† Vanegas, 'California,' vol. i. p. 27.

‡ S and D 496, 497, 561, 498, 508, 505, 511, 514, 510, 502, 509, 504, X, 501, 500, 506, 507, 513, 512, 499.

§ 'Anc. Mon. Miss. Valley,' fig. 136, No. 14.

‖ Ibid., fig. 134.

¶ Ibid., fig. 136, No. 4.

** Ibid., fig. 136, No. 7.

†† The "gorgets" are of the following materials:—Nos. 14 to 16, and 23, rather soft slate; No. 17, ferruginous claystone; Nos. 18, 26, 27, 30, whetslate; No. 26 is characteristic as to hardness, and contains a high percentage of silica; No. 19, slightly micaceous sandstone; Nos. 20, 33, clay slate; Nos. 21, 22, 31, slate; No. 24, sandstone; No. 25, limestone; No. 28, coral; Nos. 29 and 32, micaceous slate.

of the tool more than a quarter, or from that to three-eighths of an inch; as may be seen from the circular striæ left by the base of the tool when the point had penetrated to this depth; see No. 14, Fig. 82; No. 25, Fig. 86. Judging from the marks

FIG. 82.

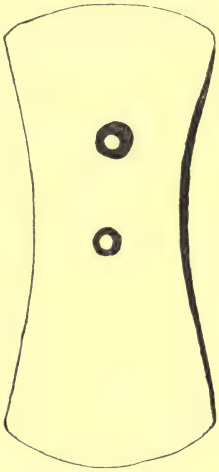


FIG. 84.

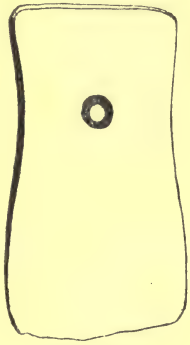


FIG. 83.

upon No. 14, this base of the tool had a diameter of about seven-eighths of an inch. The Swiss lake-dwellers appear to have employed, in some instances, a similar form of drill, as may be seen in the perforation of a stone axe, found at Allensbach, Untersee.* The holes in the gorgets are bevelled from one or both surfaces, and at the narrowest part are seldom more than one-eighth of an inch in diameter. The circular striæ left by the tool are to be seen in nearly every specimen.†

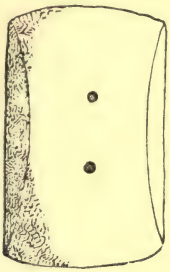


FIG. 85.

"Gorgets" found in the Ohio mounds have been chiefly associated with inhumed burials.‡ The specimen upon Tablet 26, Case C 37, Fig. 79, is, however, an exception.§

* Lee's translation of Keller's 'Lake Dwellings,' plate xxv., fig. 1.

† 'Anc. Mon. Miss. Valley,' p. 238, fig. 137.

‡ Ibid., p. 205.

§ See page 435.

These "gorgets" may have been worn suspended round the neck, resting upon the breast. It is remarkable, however, that none of the holes, as has been already mentioned,* show

FIG. 86.

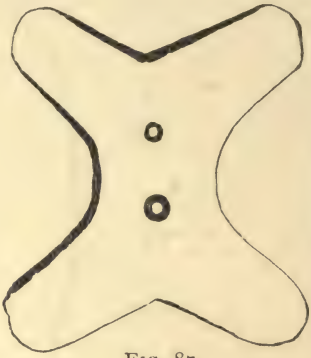


FIG. 87.

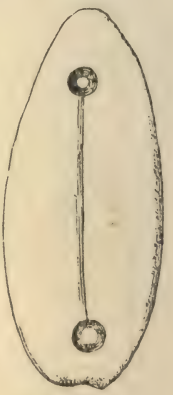


FIG. 88.

elongation from wear, and the greater part of the "gorgets" have been found by the side of the skeleton, near the bones of the hand, which does not accord with the idea of their use as neck ornaments. A stone gorget in Dr. Hildreth's collection, obtained from a mound near Chillicothe, is said to have been found resting upon the breast of a human skeleton.†

Schoolcraft has suggested that the "gorgets" were used in the manner of a rope-maker's reed for twisting fibres in making twine,‡ but the entire absence of wear inside the holes appears to be fatal to this idea. For the same reason the notion that they were used for condensing raw hide or sinews for bow-strings, in a manner analogous to wire drawing,§ cannot be entertained.

Schoolcraft remarks that these objects may have been "one of the forms of those ancient badges of authority, to which, as a generic term, the modern Algonquins apply the name *Na-be-kow-á-gun*. The native tribes, from our first acquaintance with

* See page 451.

† 'Pro. Amer. Antq. Soc.,' No. 49, April 29, 1868, p. 47.

‡ 'Archives of Aboriginal Knowledge,' vol. i., pp. 93, 94, plate xxviii., figs. 2, 3, 4, 5. The figures 4 and 5 represent the "gorget" found in the Grave Creek Mound.

§ 'Anc. Mon. Miss. Valley,' p. 238.

them, evinced their fondness for insignia of this kind. The modern medal is the result of a compliance on our part with this passion."*

"Gorgets" have been met with in the States of Virginia, Ohio, Kentucky, Tennessee, Illinois, and Indiana. Ornaments resembling the gorgets, made of shell, are described as having been worn by the "priests" of some of the southern tribes of Indians,† and by the Indians of Virginia. ‡

No. 34 (S and D 561) is a fragment of drilled clay slate from Ohio. No. 35 (S and D 536) is a piece of worked clay slate perhaps part of a gorget, found in Ohio.

B 32.

Upon Tablets 25 to 32 are some flint flakes, and arrow- and spear-heads, found upon the surface, or at an inconsiderable depth, in Mound No. 3, "Mound City." Some of these, such as *c*, upon Tablet 29, have been exposed to the action of fire. It is probable that these specimens are relics of the mound-builders. § They are all of the triangular form; not a single barbed specimen occurs among them.

B 33.

The bone tube, upon Tablet 1; the pieces of carved bone, upon Tablets 2 to 4; the fossil shark's teeth, upon Tablets 5 and 6; the reptilian teeth, upon Tablets 7 to 10; the terra-cotta tablets, upon Tablet 11; the discoïdal stones, upon Tablets 12 to 13; and the pieces of worked stone, upon Tablets 14 to 18, are noticed at pages 436—439. The pearl beads, on Tablet No. 19, are much calcined. Great quantities of pearl beads were found in the "altar" mounds, but they were in such a frail state that few could be removed. The bone implements upon Tablet 20 are noticed at page 449. Upon Tablet 21 (S and D 56) is a piece of burnt clay with a few charred threads attached to it, found in a burial mound, Ross county, Ohio. The obsidian

* 'Observations Respecting the Grave Creek Mound' in 'Trans. Amer. Ethnol. Soc.,' vol. i., p. 401, plate i., fig. 2.

† Adair, p. 84.

‡ Beverley, 'History of Virginia,' p. 141.

§ Perhaps these objects may have been thrown in by the friends, in the manner suggested at page 409.

spear-heads, upon Tablets 22 to 26, and the mica scrolls and circles, upon Tablets 27 to 32, are noticed at page 449.

B 34.

The shells and shell-beads, upon Tablets 1 to 7, and 26 to 28, are noticed at pages 454 and 468. Upon Tablets 8 to 11 are teeth of animals, drilled for suspension, among which are canines of the wild cat, wolf, and bear; and teeth of alligators.*

Upon Tablet 12 (S and D 52) are bears' claws, drilled for suspension. These were probably strung and worn as a necklace, in a similar way to the necklace No. 7, Case D 6, from the north-west coast of America, which was presented to the Collection by Sir Edward Poore, Bart. A necklace of the claws of the grizzly, or black, bear was supposed to impart to the wearer some of the courage and ferocity of the animal; it was an amulet as well as an ornament.† The Shoshonees prefer a necklace made of bears' claws to any other.‡

Upon Tablet 13 are portions of a bone ring, with drilled holes at the sides; it is stained by having remained in contact with some copper object. Upon Tablet 14 (S and D 55) is a piece of carbonised woven cloth, found in a mound in Butler county, Ohio.

Very few remains of spun thread or of woven fabrics have been recovered from the mounds. Mr. J. C. Brayton, of Aztalan, mentions that, "several feet below the surface of the large square mound, near the north-west corner of the inclosure, was found, a few years ago, what appeared to be the remains of cloth, apparently enveloping a portion of a human skeleton. Its texture was open, like the coarsest linen fabric; but the threads were so entirely rotten as to make it uncertain of what material they were made."§

The bone implements upon Tablets 15 to 25 are noticed at page 420.

* 'Anc. Mon. Miss. Valley,' pp. 230—234, 282, figs. 131, 197.

† Schoolcraft, *l.c.*, vol. i., p. 90, plate xxv., figs. 26—28; vol. iii., p. 69.

‡ Lewis and Clarke, p. 315.

§ Lapham, 'Antiquities of Wisconsin,' p. 47. This is probably the same specimen that was forwarded by Dr. King to the National Institute of Washington.—See 'Silliman's Journal,' xliv., p. 38.

C 38.

The copper "gorget," upon Tablet 15, is noticed at page 450.

The copper armlets, upon Tablets 16 to 18, and 20, are noticed at pages 435, 436.

The piece of clay, upon Tablet 19, and the galena, upon Tablets 20 and 21, are noticed at page 421.

The specimens, upon Tablets 22, are noticed at page 368.

C 39.

Upon Tablet 13 (S and D 34) are two lumps of native copper. The mound-builders appear to have worked copper only in its cold state, and they probably obtained their supply from the shores of Lake Superior, as it contains* silver in a similar way to the ore of that district.† The specimen of native copper, *b*, upon Tablet 13, is from the district of Lake Superior, and crystals of silver may be noticed on it. According to Professor Wilson, the Lake Superior copper contains on an average 3·10 per cent. of silver.‡ Native copper is highly malleable, and the mound-builders appear merely to have treated it as a *stone*, which possessed certain peculiar and valuable properties. It could be wrought to an edge or point without liability to fracture, and its malleability enabled it to be hammered into many new and convenient shapes. All this was effected without the use of the melting-pot, and probably without the knowledge that copper could be reduced by heat, and cast at once in any desired form. Sir John Lubbock has remarked that:—"The Indian axes, which are of pure copper, appear in all cases to have been worked in a cold state, which is the more remarkable because, as Squier and

* In a letter, which I have received from Professor Church, are the following remarks:—"The Lake Superior native copper is not a combination, or an alloy of silver and copper, for, when manifestly free from disseminated granules or strings of silver, its per centage of silver has been found to be very low; in one case for example, no higher than ·002 per cent. Abel, 'Journal Chemical Soc.,' II., i., p. 89. Of course in melting, and to some extent in hammering the native metal, the particles of silver would become more or less blended or combined with the copper, so that the natural segregation of the silver might be destroyed or obscured."—E. T. S.

† 'Anc. Mon. Miss. Valley,' p. 279.

‡ 'Prehistoric Man,' vol. i., pp. 342, 343. For a notice of the extensive ancient copper workings near Lake Superior, see 'Prehistoric Man,' vol. i., pp. 241—279. See ante, p. 435.

Davis have well observed, 'the fires upon the "altars" were sufficiently intense to melt down the copper implements and ornaments deposited upon them. The hint thus afforded does not seem to have been seized upon.'* This is the more surprising, because, as Schoolcraft† tells us, in almost all the works lately opened, there are heaps of coals and ashes, showing that fire had much to do with their operations. Thus, though they were acquainted with metal, they did not know how to use it, and as Professor Dana has well observed, in a letter with which he favoured me, they may in one sense be said to have been in an age of stone, since they used the copper, not as metal, but as stone. This intermediate condition between an age of stone and one of metal is most interesting."‡

Mr. Edward B. Tylor has alluded to this subject:—"Between the proper Stone and Metal ages there lies an intermediate condition, in which native copper was hammered cold into implements.§ This especially seems to have existed in North America. Such implements have been employed among the more northern savage tribes up to our own times. They were also in more extensive use among the mound-builders, who, though they do not appear on the whole to have attained

* One "cast" copper axe is, however, recorded as having been found in the State of New York, but there is no evidence to show by whom it was made.

† 'Archives of Aborig. Knowledge,' p. 97.

‡ 'Prehistoric Times,' pp. 201, 202.

§ Sir William R. Wilde has mentioned that "thirty of the rudest, and apparently the very oldest (metallic) celts (in the Collection of the Royal Irish Academy) are of red, almost unalloyed, copper."—'Cat. Mus. R.I.A.,' p. 361. In another place he says:—"There can be little doubt that these copper celts are the very oldest metal articles in the collection, and were probably the immediate successors of a similar class of implement of stone."—Ibid., p. 356. These Irish copper hatchets, unlike the American copper implements, appear to have been cast. Dr. Finlay has published (Athens, 1869) a pamphlet, in modern Greek, entitled 'Observations on the Prehistoric Archæology of Switzerland and Greece.' Among the illustrations (fig. 6) is the representation of a copper hatchet, in form precisely like the ordinary wedge-shaped stone hatchets, and, judging from the engraving, it appears to have been wrought into its present shape by hammering only. This interesting specimen measures two inches and three-eighths in length and one inch in width at the broadest part. It is described as "a small axe of pure copper, found in Eubœa, and procured for Mr. Finlay by Mr. Frank Noel." The metal is so soft, that the countryman who found it made several cuts in it with his knife, in order to satisfy himself that it was not gold. I am indebted to Mr. Hodder M. Westropp for the loan of this pamphlet, and to Mr. James Hussey for furnishing me with an abstract of its contents.—E. T. S.

to a grade of civilisation much above that of other American tribes, usually reckoned as savages, such as the Cherokees and the Apalaches of Florida, yet constructed earthworks of such enormous magnitude as could only have been the work of a dense and settled agricultural population."*

According to Professor Wilson, the mound-builders "were not far advanced in civilisation. Compared with the people of Mexico or Central America, when first seen by the Spaniards, their arts and social state were probably rudimentary. But they had emerged from that stage in which it is possible for a people to continue utterly unprogressive. They were, indeed, far more in advance of the Indian hunter tribes, than they lagged behind the civilised Mexicans. They had already acquired habits of combined industry, and were the settled occupants of a specific territory. It is not necessary to assume a very remote antiquity for the period of this abortive American civilisation."†

The tools used in carrying on the very extensive ancient copper workings near Lake Superior appear to have been chiefly, if not entirely, stone hammers and wedges. According to Mr. C. Whittlesey traces of ancient copper mining extend over an area of from one hundred to one hundred and fifty miles in length, along the southern shore of the Lake.‡ Fire, however, was apparently an important agent in separating the copper from its rocky matrix. Before the introduction of gunpowder, fire was universally employed in excavating rock, and where fuel abounds, as in the old Harz and Altenberg mining districts of Europe, it is even now found to be an economical mode of destroying silicious rocks. The rock having been subjected to this process by the ancient American miners, stone hammers or mauls were employed to break it in pieces. These implements have been found in immense numbers on the different mining sites. Mr. Knapp obtained in one locality upwards of ten cart-loads; and Professor Wilson was shown a well, in the neighbourhood of the Ontonagon trenches, constructed almost entirely of stone hammers obtained from ancient workings in the immediate vicinity. Many of these mauls are mere water-worn, oblong boulders of greenstone or porphyry, roughly

* 'Condition of Prehistoric Races,' &c., in 'Trans. International Congress Prehistoric Archæol.,' 1868, p. 13.

† 'Prehistoric Man,' pp. 274—276.

‡ Paper read at the Montreal meeting (1857) of the 'American Association,' quoted by Wilson, 'Prehistoric Man,' vol. i., pp. 246, 247.

grooved in the centre, so as to admit of their being hafted by passing a withe around them. Some of these implements, however, are well finished. They vary in weight from ten to forty pounds each. Many are broken, and some of the specimens are worn and fractured from use. Besides these, smaller stone chisels or axes are also found, with a groove towards the thicker end; these generally weigh from five to six pounds each.*

The present race of Indians appear only to have availed themselves of the mineral wealth of the great copper regions, by gathering the chance masses, or by hewing off pieces from the exposed copper lodes, in full accordance with the simple arts of the Stone period.† There is no reason for supposing that the mound-builders possessed copper in such abundance as would have resulted from their having carried on the extensive mining operations to which allusion has been made. They probably, like the present race of Indians, contented themselves by picking up pieces of this *malleable stone.* That such were to be had in sufficient abundance appears to be shown by an anecdote related by Father Dablon, of four Indians, who, in old times, before the coming of the French, had lost their way in a fog, and at length effected a landing on the island of Missipicooatong. They proceeded to cook their meal in Indian fashion by "stone-boiling."‡ The *stones* proved to be lumps of copper, which the Indians carried off with them; but they had scarcely left the shore when a loud and angry voice, ascribed by one of them to Missibizi, the goblin spirit of the waters, was heard exclaiming, "What thieves are these that carry off my children's cradles and playthings?" One of the Indians died immediately from fear, and two others soon after, while the fourth only survived long enough to reach home and relate what had happened before he also died; all having no doubt been poisoned by the copper used in cooking.§

C 39.

Upon Tablet 14 (S and D 16), *a* to *g*, are pieces of copper ornaments, found on the mound "altars;" they are all much injured by fire. Upon Tablet 14 *h* is a piece of plate copper,

* 'Prehistoric Man,' pp. 253, 254.

† Ibid., p. 271.

‡ See pp. 59—61.

§ 'Prehistoric Man,' p. 269.

which may have formed part of the covering of the base of a stone smoking-pipe, like the specimen *d*, upon Tablet 19. Upon Tablet 15 (S and D 18), *a* to *j*, are pieces of plate copper, which have perhaps been used for covering stone smoking-pipes. Upon Tablet 16 (S and D 15), *a* to *h*, are other pieces of thin copper; *b*, *c*, *d*, and *e* may have been used for covering pipes; *f*, *g*, and *h* are parts of personal ornaments. Like the other mound objects, they are much injured by fire; *a* may have served as an ornamental band for the base of a smoking-pipe.*

Upon Tablet 17 (S and D 11), *a* to *f*, are remains of personal ornaments of copper, molten from the heat to which they have been exposed. Upon Tablet 18 (S and D 14), *a* is a copper ring; *b* to *f* (S and D 12) are copper beads, made of two plates of thin copper, united at the edges by hammering. They are flat on one surface and convex on the other. Some of these objects are perforated with holes, through which thread may have been passed to attach them to the dress or the person.†

Upon Tablet 19 (S and D 6), *a* to *c* are pieces of molten copper, from the mound "altars." Upon Tablet 19 *d* (S and D 26) is part of the base of a stone smoking-pipe, covered with sheet copper, which has been beaten over at the sides; *e*, upon the same Tablet, is part of the base of a stone smoking-pipe, with a tube of copper inserted in the hole. This tube still projects about an eighth of an inch beyond the end of the pipe, and it is probable that the lips were applied to such a tube in smoking this variety of pipe. The absence of stain from copper within and around the holes in the mound pipes, would lead to the supposition that a quill or straw may have been generally used; as, indeed, is the case with the modern Indians of the north-west coast in smoking such pipes as Nos. 26 to 33, Case E 5. The mound pipe, No. 4, Case C 34, however, is very much stained at the hole, and was probably used with an inserted tube of copper.‡

Upon Tablet 20 (S and D 4) is a wedge-shaped copper hatchet, apparently cast; it has not been exposed to the action

* It is engraved in the 'Anc. Mon. Miss. Valley,' p. 207, fig. 95. No. 3 *h* is also engraved, fig. 95, No. 1.

† 'Anc. Mon. Miss. Valley,' p. 207, fig. 94.

‡ At page 352 it was mentioned that the mound pipes were probably smoked *without* the use of a tube. The kind of tube there alluded to was a long pipe-stem of wood, such as those in general use by the hunter tribes of North America, examples of which may be seen in Case E 5.

of fire since it was cast, and it does not resemble the other copper objects taken from the "altars" in condition. Probably it should not be regarded as a relic of the mound-builders.

Upon Tablets 21 and 22 are some bronze and copper objects, from Peru, for comparison.

D 19.

Upon Tablet 6 (S and D 736) are fragments of one of the mound "altars" of burnt clay.

Upon Tablet 7 (S and D 1) are pieces of galena.

Upon Tablets 11 to 13 (S and D 50, 44,) are fragments of marine shells.

Upon Tablets 14 and 15 (S and D 51) are fragments of fresh-water shells.

Upon Tablets 16 to 19 (S and D 1) are pieces of antler, noticed at page 420.*

Upon Tablets 20 and 21, in box No. 27, and in glass dishes, Nos. 28, 29, and 31 are burnt human and animal bones, from the "altar" mounds.

In the glass dishes, Nos. 25 (S and D 26 and 27) and 32 (S and D 11) are human and animal bones, from the burial mounds.

In the glass dishes Nos. 23, 24, 26, and 33 are fragments of stone smoking-pipes, much calcined.

In the glass dish No. 22 are burnt reptilian bones and cetacean teeth.

No. 30 (S and D 523) is part of a block of ferruginous sandstone, found in one of the Ohio mounds. It has been broken off from the much larger mass figured by Squier and Davis,† which originally weighed between thirty and forty pounds. The surface of this stone was pitted with cup-shaped depressions. The oblong fragment in the Blackmore Collection measures six inches by eight, and has upon it three perfect detached cups, two cups which are confluent, portions of three finished cups, one half finished, and several which have been commenced.‡ It may be well to remark that these "cups" are

* Upon looking to page 420, I find that the material, through an oversight, is termed *red-deer's*, instead of elk's, antler. The red deer (*Cervus elaphus*) is not found in America —E. T. S.

† 'Anc. Mon. Miss. Valley,' p. 206, fig. 92.

‡ Canon Greenwell informs me, that the "cup-cuttings" found by him, in the Wass Moor barrows, occur in every stage of completion, some being apparently finished, others only commenced.—E. T. S.

oval, there being a difference in the two diameters of about one-eighth of an inch. They measure in their greater diameter about one inch and a half, and are about seven-eighths of an inch in depth. Judging from the engraving in the "Ancient Monuments of the Mississippi Valley," the cups upon the original mass were not all of the same size. One corner of the fragment, No. 30, indicates that it has been exposed to the action of fire, Squier and Davis have suggested that these cups were used in hammering plates of copper into the convex form needed for making bosses, such as those shown in Case E 6, upon Tablets 2 and 3. The circumstances that two of the cups are confluent, that the surface of the block has not been smoothed,* and that there is no evidence of bruising from hammering, all militate against the idea that this block was used, or was even intended to be used, as an anvil.

On the other hand, "cup-cuttings"† closely resembling those upon this block have been found in the British Isles, Scandinavia, the Channel Islands, Britanny and Switzerland.‡

* Sir James Simpson has mentioned that the ancient ring and cup-cuttings which exist in various parts of Scotland "are all cut upon the natural and uneven surfaces of the stones or rocks on which they are found. No artificial levelling and hewing of these surfaces has been made before or at the time the figures were carved upon them. Very generally rock surfaces that are naturally and comparatively smooth have been selected for these sculptures. But often, also, they are cut upon undulating and broken faces of stone; and in this last case the lines of the sculptures follow continuously, without stop or interruption, over all the irregularities of the stone-surface, dipping into its sinuosities and mounting over its elevations, quite irrespectively of its heights, hollows, and other inequalities." 'British Archaic Sculpturings,' Edinburgh, 1867. p. 13.

† Mr. Albert Way, who was engaged in the very earliest investigations of the "cup-cuttings," in the district of the Northern Borders, out of which all the other finds and researches have originated, has favoured me with a letter, from which the following is an extract:—"You adopt the general term 'cup-cutting.' I will not take exception to it, but I have been accustomed in my search to regard the concentric circles, which in some districts are almost invariably penannular, or discontinuous, as the more striking feature of the mystery. In Northumberland, and, I think, in Western Scotland and in Ireland, these concentric circles are very conspicuous; the cups occur as centres, but cups are not the most striking characteristics of these very curious rock-markings." Concentric circles are not present upon the specimen in the Blackmore Collection, neither do they occur upon the American rocking stone figured by Kingsborough. See page 491.—E. T. S.

‡ Sir James Simpson has pointed out that "all the cup-like excavations which we meet with on megalithic circles, monoliths, &c., are not by any means the work of man. Many of them are, on the contrary, the work of

"The simplest type of these ancient stone and rock cuttings consists of incised hollowed-out depressions or cups, varying from an inch to three inches or more in diameter. For the most part these "cup-cuttings" are shallow. Consequently their depth is usually far less than their diameter; it is often not more than half an inch, and rarely exceeds an inch or an inch and a half. On the same stone or rock surface they are commonly carved out of many different sizes. . . . . The simple "cup-cuttings" are generally scattered singly, and apparently quite irregularly, over the surface of the stone; but occasionally they seem placed in groups of four, six, or more."*

"Cup-cuttings" occur on the megalithic circle of stones, termed the *Calder Stones*, standing within a few miles of Liverpool;† upon one of the stones in the *Oatlands* circle, on the farm of Ballakelly, parish of Santon, Isle of Man;‡ upon a rock at *Kirk Braddan*, Isle of Man;§ upon a large slab from the neighbourhood of *Sneem*, in the county of Kerry, Ireland;‖ upon a cromlech at *Clynnog Fawr*, Caernarvonshire;¶ upon some of the stones in chambered tumuli at *Clava*, Inverness-shire;** upon a monolith standing close to the spot where a barrow formerly

nature; or, in other words, the results of the weathering and disintegration of the stone from long exposure. Among the endless vagaries of shape and form effected on rocks by weathering, cup-like excavations occur frequently on the surfaces of primary sandstone and other softer rocks, like those of the Lundie Stones in Fife and the Duddo Circle in Northumberland; and I have found them also on the surfaces of far denser stones. Occasionally they are the result of the mineralogical constitution of the rock, as of softer portions weathering out, or of the enucleations of fossilized organic remains, or of imbedded stone-nodules. Thus the surface of the Carline Stone, near Dunmore House, presents a series of smooth, cup-like excavations; but they are all the result of round included masses having been weathered out of the amygdaloid rock of which the stone is composed." 'British Archaic Sculpturings,' pp. 3, 4.

* Simpson, *l.c.*, pp. 2, 3. See plate iii., which represents the largest stone from the circle at *Rothiemay*, Banffshire. Plate iv., fig. 1, stone from the circle at *Thorax*, Banffshire. Fig. 2, stone which was formerly in the centre of the circle at *Moncrieff*, Perthshire. Fig. 3, monolith, standing near *Dunbar*, East Lothian, Plate ix, fig. 1, cromlech at *Ratho*, Edinburghshire.

† Ibid., p. 8, plate vi., figs. 1 and 3.

‡ Ibid., plate viii., fig. 1.

§ Ibid., plate xxvi., fig. 4.

‖ Ibid., plate xxvii.

¶ Ibid., plate ix., fig. 2.

** Ibid., plate x., figs. 3 and 4.

existed, at *Matfen*, Northumberland;* and upon a stone from a cairn at *Cloughton Moor*, near Scarborough.† Near Robin Hood's Bay, a rock was found, which had several series of circles cut upon it. In a tumulus at Way Hag, near Hackness, similar symbols were discovered, sculptured upon slabs, which, apparently, had formed the covers of burial places.‡

Canon Greenwell opened some tumuli at Wass Moor, near Helmsley, in June, 1869. In two of these he found stones with "cup-cuttings." In one barrow there was but a single specimen, but in another there were more than a score of them. The stones varied in size and shape; some had but one "cup," others had a row of six or eight; in certain cases the "cups" only occurred on the edge of the stone, some of them being connected by a groove. The "cups" in every instance were without signs of wear, and the tool marks could be plainly seen. The tool employed was very pointed; a pick, not a chisel. One of the specimens is a stone slab, measuring eight inches by five and a half, and having a "cup-cutting" on each surface. One of these "cups" was an inch and a quarter in depth, the other only an inch and one-eighth; the stone slab is two inches and a half in thickness. On another stone is a "cup-cutting," four inches and a half in diameter one way, and four inches in the other, with a depth of an inch and five-eighths. Some of the "cups" are reniform, but most of them are circular.§

The large covering-slab of the stone chamber in the great tumulus, Mont St. Michel, Carnac, Britanny, had six "cup-cuttings" on the under surface.‖

* This example was mentioned in a letter which has reached me from Canon Greenwell, who adds:—"Of course, as you know, there are many other examples of 'cup-cuttings,' in addition to those you have cited; but it will be well to include Northumberland, as that is the county where they were first observed, and in which examples occur in the greatest abundance." —E. T. S.

† Simpson, *l.c.*, plate xi., fig. 4.

‡ Greenwell, 'Anc. Grave-hills North Riding of Yorkshire,' in 'Archæol. Journal,' vol. xxii., pp. 99, 100. Canon Greenwell has only noticed one instance, in the north of England (on a side stone of a cist, at Harbottle, Northumberland), in which "cup-cuttings" were associated with an inhumed burial; in all the other cases cremation had taken place.

§ Communicated by Canon Greenwell. See also 'Malton Messenger,' June 12, 1869.

‖ Barnwell, 'Saint Michael's Mount, Carnac,' in 'Archæologia Cambrensis,' 3rd series, vol. x., pp. 48, 49. Simpson, *l.c.*, plate xi., fig. 6. See ante, p. 402—404.

The Rev. W. C. Lukis has found thirteen instances of "cup-cuttings" on stones of *tolmens* in the Morbihan, &c.; ten being on cap-stones (one on a support as well as cap-stone of the same structure), one on a support alone, and one on a slab near the entrance of a galleried chamber.* He has observed two instances of "cup-cuttings" on *menhirs*,† one on a rock,‡ and another on a loose block of stone.§ In only a single instance did Mr. Lukis find oval "cups," viz., in two of the nine markings on cap-stone at St. Sebastien, Piriac, Loire-Inférieure; all the others are circular, about two inches in diameter, and half an inch in depth.‖

"Cup-cuttings" occur on a monolith in a village of the Forest in Guernsey;¶ and on one of the stones forming part of a cromlech at *Lancresse*, in the same island.** "Cup-cuttings" also occur upon a granite block, known as *Balder's Altar*, *Baal's* ††

* 1. On cap-stone and support of chamber, on roadside between Plouharnel and Carnac.
2. On cap-stone of chamber, at Runusto, Plouharnel.
3. On support of side-chamber, Klud-er-ier, Carnac.
4. On under surface of cap-stone, Mein Drein, Locmariaker.
5. On prostrate stone, at entrance of Pierres Plates, Locmariaker.
6. On cap-stone of chamber, near village of Keroulay, Locmariaker.
7. On cap-stone of chamber, at village of Pé, near St. Nazaire, Loire-Inférieure.
8. On cap-stone of chamber, in Ile de la Motte, Kerbourg, Loire-Inférieure.
9. On one of the encircling stones of tumulus, in Ile de la Motte, Kerbourg, Loire-Inférieure.
10. On cap-stone of chamber, St. Sebastien, Piriac, Loire-Inférieure.
11. On cap-stone of dilapidated chamber, La Pierre du Jeu, near Crossac, Loire-Inférieure.
12. On cap-stone of chamber, on the Grée de Cojou, Ile et Vilaine.

† 1. On fallen *menhir*, near La Pierre Blanche, Kerbourg, St. Lyphard, Loire-Inférieure.
2. On *menhir*, Trevédais, near Guerande, Loire-Inférieure.

‡ On a rock between Quiberon and Port Haleguen, Morbihan.

§ On a block of granite, in village of Beaumer, Carnac, Morbihan.

‖ I am indebted to the Rev. W. C. Lukis for the above information.—E. T. S.

¶ Simpson, *l.c.*, plate viii., fig. 2.

** Ibid., plate viii., fig. 3.

†† Lexicographers assign to the word *Baal* the meanings "lord," "master," "owner," "possessor," "husband;" it also signifies "to be big, strong, mighty." Sanscrit, *bala*, "strength." The term *Baal* was frequently used as a prefix to a second name, which denoted some special attribute. Thus we have *Baal-Berith* (Judges viii., 23), "Baal the Covenanter;" *Baal-Gad* (Josh. xi., 17); *Baal-Hamon* (Cant. viii., 11), "The God of riches;" *Baal-Hanan* (Gen. xxxv., 38), "Baal is gracious," or "the merciful Baal;" *Baal-*

or *Balder's Stone*, near Falköping, Sweden.* Colonel Schwab discovered a block of stone, placed upon an exposed eminence near Bienne, on the surface of which were about twenty "cup-cuttings."† Another stone, preserved in the collection of Colonel Schwab, said to have been found in a grave on the height of Jolimont, has four "cups" upon its surface. Other examples of "cup-cuttings" have been mentioned by Dr. Keller; indeed, they appear to exist in great numbers in Switzerland, chiefly, however, in the western cantons, as Vaud, Fribourg, and Berne. They have been found on rocks *in situ*, but more generally on erratic blocks of gneiss, granite, schists, &c. The "cups" are usually from three to five inches in diameter, and are generally very shallow in depth.‡

The "cup-cuttings" upon the Ohio block are not the only American examples which have been observed, although hitherto the resemblance between these singular sculptures in the old and the new world appears to have been unnoticed. Lord Kingsborough has figured a rocking-stone, described as being situated in the middle of a large plain, near Orizaba, upon the surface of which (as shown in the plate) there are fourteen "cup-cuttings."§ The description given of this stone is as follows:—"It is spherical in its form, very hard, and of a dark blue colour. It has evidently been wrought into its present shape, and placed in the middle of a spacious plain, by the ancient inhabitants of the country. It is so artfully balanced on its axis as to revolve at the slightest touch of the finger; but if a greater force be used it will stand without the least apparent

Hazor (2 Sam. xiii., 23), "The Lord of safety;" *Baal-Hermon* (Judges iii., 3), "The Lord of Hermon;" *Baal-Meon* (Josh. xiii., 17), "The Lord of the heavenly habitation;" *Baal-Peor* (Numb. xxv., 3). This particular form of god is Mahadeva, Siva, Chrishna, Bramah, El, Asher, Ash, Dionysus, Bacchus, Ab, Saturn, Jao or Jupiter, Osiris, Adonis, Hercules, under a different name. *Baal-peor* was reproduced in later times as Priapus. *Baal-perazim* (2 Sam. v., 20), "Baal of the fissures." Clefts in the earth were at one time considered sacred, and persons went into them and came out again, so as to be born anew. See page 493, *note*; *Baal-Shalisha* (2 Kings iv., 42), "My Lord the trinity;" *Baal-Tamar* (Judges xx., 2, 3), "Baal, the palm tree;" *Baal-Zephon* (Exod. xiv, 2), "My Lord the shining On."—See Dr. Inman, 'Ancient Faiths embodied in Ancient Names,' vol. i., pp. 320—329.

* Simpson, *l.c.*, plate xxxi., fig. 1.

† Lee's translation of Keller's 'Lake Dwellings,' p. 281, &c., plate xxxix., figs. 12, 13, and 14. Simpson, *l.c.*, pp. 153, 154, fig. 1.

‡ Simpson, *l.c.*, p. 156.

§ 'Mexican Antiquities,' vol. iv., part i., fig. 10.

motion. Its surface contains some holes capable of holding a small quantity of water. It appears to have anciently served as a landmark. There is another of these stones to the east, about six miles distant."* The "cup-cuttings" seem to be scattered irregularly over the surfaces of this stone.

Canon Greenwell appears to be the person who first brought the subject of these rock-sculptures and "cup-cuttings" before the public, in a paper read at the Newcastle meeting of the Archæological Institute, in 1852.† He has always held the opinion that they are religious symbols.‡ Other suggestions as to their probable meaning and object have been offered. They have been supposed to be archaïc maps, or plans of old circular camps; but this idea has been abandoned as untenable by some, if not by all, of the antiquaries who first suggested it. The "cup-cuttings" have been regarded as rude representations of the sun and stars, and have been connected with the worship of the Persian god Mithras, or of the Phœnician god Baal. Professor Nilsson is the chief supporter of the theory of the Phœnician origin of the "cup-cuttings." He holds that Druidism was a form of religion that never reached Scandinavia, and that, anterior to Druidism in Britain, there existed here, and in the north of Europe—as a result of Phœnician commercial intercourse and colonisation—a form of eastern solar worship; that our megalithic circles, &c., were reared by these Sun-worshippers; that Stonehenge, Abury, &c., were erected as temples to the Phœnician Sun-god, Baal; and that the "cup-cuttings" were made as symbols of the sun. Professor Nilsson further maintains that this supposed solar worship in Western and Northern Europe prevailed during the Bronze period. Sir James Simpson considers that the "cup-cuttings" are by no means confined to the Bronze period; that we have no evidence whatsoever, from any Phœnician or other ancient remains, that cup-symbols were ever anywhere connected with

* Kingsborough, *l.c.*, vol. vi., p. 425.

† Sir Gardner Wilkinson has claimed priority of observation. The first publication and representations were by Dr. Johnson of Berwick, in his 'Nat. Hist. of the Eastern Borders.' This work was founded upon information obtained from Canon Greenwell. Sir James Simpson's book was preceded by an elaborate memoir in the 'Trans. of the Berwickshire Naturalists' Club,' by Mr. George Tate, of Alnwick, containing a number of excellent illustrations. The great work, however, is the large folio, in which all the examples in Northumberland (then known) were carefully figured, at the cost of the Duke of Northumberland, with an Introduction by Dr. Collingwood Bruce.

‡ 'Archæological Journal,' vol. xxii., p. 99, *note.*

Solar worship, or with the religion of Baal; that these cup-cuttings have been found over too wide an area for us to assign their production to Phœnician influence, unless—contrary to all existing ideas—the Phœnician people had found an extensive general domicile in Great Britain. It must also be borne in mind that "cup-cuttings" have not hitherto been discovered in the true colonies and country of Phœnicia.

"Cup-cuttings" occur upon some of the chamber-stones in tumuli in Britanny, which, when opened, contained objects exclusively belonging to the Stone period. Although carefully looked for by Sir Gardner Wilkinson in Devonshire, and by him and by Mr. Blight in Cornwall, "cup-cuttings" have not yet been found (with one single exception) in any part of these two counties. Yet, if these "cups" had been Phœnician in their origin, they ought certainly to have been discovered more abundantly in these two counties than in any others, seeing they form the district in which alone the ancient tin trade existed. Sir James Simpson does not profess to solve the mystery connected with these "cup-cuttings." He suggests that they, and the "ring-cuttings" with which they are so frequently associated, may have been simply ornamental, or, perhaps, may have been connected with some religious symbolism.

These "cup-cuttings" may have imparted a symbolic import to stones, which, perhaps, were used as objects of worship, or were deposited in the tumulus with the ashes of the dead to sanctify and protect the remains. The worship of *menhirs*, or unwrought monoliths, and of *tolmens*, or stones having a natural perforation,* appears to have been almost universal; but the subject, for obvious reasons, cannot be entered upon in the present work. A few leading instances of some of the superstitions connected with *menhirs* and *tolmens* may be cited.

In the parish of Minchin Hampton, Gloucestershire, is a stone called "Long Stone." It is seven or eight feet in

* Natural chasms in rocks or holes in the earth, of unknown origin, have been regarded as emblems of the celestial mother. There is much curious information on this subject in Godfrey Higgins' 'Anacalypsis,' where we are told that the early Christian preachers found the custom in Yorkshire, and tried to abolish it by cursing the sacred chasms, and naming them Cunni Diaboli. Lysons, in 'Our British Ancestors,' also gives some interesting observations on perforated stone entrances to chambered tumuli, Holes in the Wall, Hell Holes, &c., and quotes from a 'Journey to the East,' by Miss Ellwood, as follows:—"There is a sacred perforated stone at Malabar, through which penitents squeezed themselves in order to obtain a remission of their sins." P. 160. See Dr. Inman, 'Ancient Faiths,' p. 114, *note*.

height, and near the bottom is a natural perforation, through which, not many years since, children, brought from a considerable distance for the purpose, used to be passed for the cure and prevention of disease, and in particular for the relief of hooping-cough and measles.* Certain holed stones in Cornwall are resorted to by the peasantry for similar superstitious purposes.† Some of the chambered tumuli have a *tolmen* entrance to the chamber.‡ Dr. Thurnam has figured the tolmen entrance to the Avening chamber (Gloucestershire), and also that on the north side of the barrow at Rodmarton § A similar method for entering the chambers is described by the Rev. W. C. Lukis, as existing in two parts of the chambered barrow at Kerlescant, in Britanny. Mr. Lukis thinks that the hollows in these stones, which, placed side by side, form the oval entrance holes, just large enough for a person to creep through,‖ are not natural, but formed by cutting away the edges of two contiguous props.¶

In some instances, instead of a *tolmen*, a monolith was placed *in* or upon the tumulus. *In* the chambered tumulus at Ablington, Gloucestershire, there was found a large upright oval stone, six feet in height and five feet in width, standing on a block of stone having a natural perforation, and by which it was steadied and kept in its place.** *Upon* a long barrow, at Duntesbourne Abbots, Gloucestershire, is a monolith known as the "Hoar Stone," and *upon* another long barrow, in the same county, is a a monolith, known as the "Tingle Stone." The ancient Greeks, in like manner, appear to have placed a monolith (στήλη) upon the summit of some of their tumuli,†† and Paris, who was skilled in archery, taking his position behind the στήλη on the barrow of Ilus, shot at Diomede, wounding him in the foot.‡‡ "This

* See the same custom, as regards the tolmen called "Odin Stone," at Stenness, Orkney.—'Archæologia,' xxxiv., 101. For tolmens and their uses, see a paper 'On Holed Stones,' by Mr. R. R. Brash.—'Gent. Mag.,' Dec., 1864, pp. 686—700.

† Thurnam, 'Anc. Brit. Barrows,' 'Archæologia.' 1869.

‡ The Hon. W. O Stanley has specially noticed these perforated entrances in a memoir on the tumulus, Plas Newydd, Anglesey.—'Arch. Camb.,' fourth series, vol. i., p. 51.

§ Thurnam, *l.c.*, figs. 11 and 12.

‖ 2ft. by 1ft. 8in. and 3ft. by 1ft. 6in.

¶ 'On a Chambered Long Barrow at Kerlescant, in Britanny,' in 'Journ. Brit. Archæol. Assoc.,' 1868, xxiv., 40, plates 2, 3.

** Thurnam, 'Anc. Brit. Barrows,' 'Archæologia,' 1869.

†† See Iliad, xi., 371; xvi., 457; xvii., 434; Odyssey, xii., 11.

‡‡ Iliad, xi., 370.

στήλη, then," says Mr. Paley, "was of some size, for it was large enough to enable the archer to conceal himself, and it is termed his λόχος, or place of ambuscade."*

The superstitious veneration and worship of stones continued in certain districts to a comparatively late period. Thus, by the twentieth canon of a council held at Nantes, in Britanny, the "stones which are venerated in ruinous places and in the forests," are ordered to be dug up and thrown into such a place as to be concealed altogether from those who worshipped them.† The partial execution of this difficult order may explain the ruinous condition of so many of the tolmens and menhirs of this part of France.

Rude consecrated stones (*menhirs*) are to be seen in the Fiji Islands, to which offerings of food are sometimes made. Two of these Fijian *menhirs* are figured,‡ one with a *liku* tied round the middle, and the other ornamented with, what seem to be, three "cup-cuttings" surrounded with concentric circles.

"Cup-cuttings" appear never to have been associated with any form, however rude and primitive, of letter-cutting or letter-writing. Although the "cup-cuttings" did not commence during the Bronze period, it is probable that they were continued into, and, perhaps, extended during the Bronze period. The very formation and cutting of these cups has been supposed of itself to have necessitated the use of metallic tools. The late Dr. Lukis has observed that it is difficult to conceive the possibility of sculpturing the stones in some of the cromlechs of Wales and Britanny by any but metallic tools,§ and MM. Merimée and Closmadeuc express a similar opinion as to the impossibility of sculpturing the stones of Gavr' Inis without metallic implements.‖

In the museum at St. Germain, however, there are some blocks of granite, upon which figures resembling those upon the stones at Gavr' Inis have been cut with an *ancient* flint tool within the last two or three years;¶ and Sir James Simpson has

* 'On Homeric Tumuli,' in 'Trans. Cambridge Philosophical Society,' vol. xi., part 2.

† "Lapides quos in ruinosis locis et sylvestribus dæmonum ludificationibus decepti venerantur, ubi et vota vovent et deferunt, funditus effodiantur, atque in tali loco projiciantur, ubi nunquam a cultoribus suis inveniri possint."

‡ Williams, 'Fiji and the Fijians,' vol. i., p. 220.

§ 'Archæologia,' vol. xxxv., p. 250.

‖ 'L'Ile de Gavr' Inis,' &c., p. 14.

¶ I believe that the very interesting series, intended to illustrate the possibility of working hard varieties of stone with *ancient* tools of stone and bronze,

proved experimentally that ring and cup-cuttings *can* be produced upon the Argyleshire schist and hard Aberdeen granite with a flint chisel and a wooden mallet. In the Edinburgh Antiquarian Museum there is a block of grey Aberdeen granite from Kintore; it is one of the ancient sculptured stones of Scotland, and has upon one side two crescents, &c. On the back of this hard granite Mr. Robert Paul, the doorkeeper of the Museum, tried, at Sir James Simpson's request, the experiment alluded to, and cut in two hours two-thirds of a circle, with a flint and a wooden mallet. The flint used was about three inches in length, an inch in breadth, and about a quarter of an inch in thickness. The circle which was sculptured with it in the granite is seven inches in diameter, and the incision itself is nearly three-quarters of an inch in breadth, about a quarter of an inch in depth, and very smooth on its cut surface. In sculpturing the circle, the sharp tips of the flint tool from time to time broke off, but another sharp edge was always immediately obtained by merely turning the flint round. This experiment shows conclusively that such sculptures might have been produced during the Stone age.

"Cup-cuttings" have been discovered along the *whole length* of the British Isles, from Cornwall and Dorsetshire in the South, to Orkney in the far north; and across their *whole breadth*, from Yorkshire and Northumberland on the eastern coast of England, to Kerry on the western coast of Ireland. At these distant and diverse points, and in the mainland districts between them, they everywhere present a sameness of type and form.* Should the American "cup-cuttings" prove to be of the same nature and character as those found in Europe the interest of the whole question will be greatly extended.

E 6.

The vessel No. 1 is noticed at page 418.

The copper bosses upon Tablets 2 and 3 at page 419.

Upon Tablets 4 to 10, 16 and 17, and in Dishes 20 to 22, (S and D 62) are fragments of pottery found in the mounds.

is now shown in one of the newly-opened rooms at St. Germain. I have not seen the Collection since the autumn of 1867. At that time these specimens were not in the rooms thrown open to the public, and I was indebted to the kindness of the curators, MM. Bertrand and Mortillet, for showing them to me.—E. T. S.

* See 'British Archaic Sculpturings,' pp. 92—152.

In the glass dishes 11, 18, and 19 are fragments of calcined stone smoking-pipes.

The smoking-pipes Nos. 12 and 13 are noticed at page 436.

Upon Tablets 14 and 15 (S and D 736) are fragments of mound "altars" of burnt clay.

The two copper wedge-shaped hatchets, Nos. 23 and 29, are noticed at page 422.

The plates of mica, No. 24, are noticed at page 421.

The two shells Nos. 25 and 26 are noticed at page 447.

The two vessels No. 27 (S and D 2) and No. 28 (S and D 1) belong to secondary interments. No. 28 is noticed at page 421.

E 9.

In the glass dish 1 are fragments of a stone pipe, perhaps intended to be smoked with a tube.

In the glass dish 2 are fragments of calcined stone smoking-pipes.

In the glass dishes 10 and 11 are fragments of pottery found in a tumulus near Fort Wadsworth, Dahcota country.

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It is probable that some relics of the mound-builders may be included with the objects about to be described, none of which, however, were actually exhumed from the mounds.

A 48.

No. 1 (S and D 475).—A ball of greenstone, found in Ohio.

No. 2 (S and D 471).—Ball of syenite, Ohio.

No. 3 (S and D 476).—Ball of greenstone, Ohio.

No. 4 (S and D 472).—Ball of quartzose rock, Ohio. A stone ball, resembling the specimens in this case, found in New Mexico, is shown in Case A 42, No. 10. Probably, some of these stone balls may have served for weapons, wrapped in leather, and mounted at the end of a stick.*

The Shoshonees use a weapon, which was also formerly employed among the Chippewas. It is called *pogamoggon*, and consists of a stick, twenty-two inches in length, about the size of a whip-handle, covered with dressed leather. At one end is a thong about two inches in length, which is tied to a round stone weighing about two pounds, and held in a cover of leather; at the other end of the stick is a leathern loop; this loop is passed round the wrist in order to secure the hold of the weapon, with which a very severe blow can be given.†

A modern example of this weapon may be seen in Case C 41, No 31.

Carver describes a weapon in use by the tribes beyond the

* Schoolcraft, 'Archives of Aborig. Knowl.,' vol. i., p. 284.

† Lewis and Clarke, *l.c.*, p. 310.

Mississippi river, which consisted of a curiously wrought stone, enclosed in leather, and fastened like a slung shot to a thong a yard and a half in length, which, when in use, was wound round the wrist.*

An analogous weapon, in use by the Esquimaux, may be seen in Case E 3, No. 36. It consists of a stone ball, with a drilled hole, through which a strip of raw hide is passed to serve as a handle. Wood being scarce with the Esquimaux, this specimen shows the ingenious mode of supplying the want of one material by the use of another, which is comparatively abundant.

No. 5 (S and D 474) is a ball of chert, flattened on the under side. It was found in Ohio, and is bruised upon the surface like the flint balls met with in England, supposed to have served as hammer-stones. See No. 3, Case A 20, found at Icklingham; and several examples from Bridlington, in Case A 21. No. 6 (S and D 479) is a ball of greenstone, with a groove worked around the centre, Ohio. No. 7 (S and D 477) is a ball of limestone, grooved like No. 6, Florida. No. 8 is a grooved quartzite hammer-stone, Fig. 89. Probably these implements were hafted by passing a withe around the groove. Country blacksmiths and plate-layers on railroads still haft their hammers in this manner. A modern iron hammer, mounted in a withe, may be seen in Case C 42, No. 34.

Fig. 89.

No. 9 (S and D 478) is an egg-shaped object of limestone, Ohio. No. 10 (S and D 537) is a conoïd-shaped object of mica slate, Ohio, Fig. 90. No. 11 (S and D 538) is a similar object to No. 10, made of ferruginous rock, containing quartz, &c., Ohio. No. 12 (S and D 539) is an object similar in form to Nos. 10 and 11, but more carefully finished than they are, and made of hæmatite, Ohio. These objects are classed by Dr. Davis as mullers for grinding paint. Neither of the three specimens, Nos. 9 to 11, are worn on the under surface, so that if intended for mullers they have not been used. No. 13 (S and D 541) is a ball of hæmatite, with the under side flattened, Ohio. This specimen may have been used as a muller; the under surface

Fig. 90.

* Quoted in 'Anc. Mon. Miss. Valley,' p. 219.

has been considerably worn, and if the mass was rubbed down with water, the muller itself would have furnished a red paint for the decoration of the person or weapons. Pieces of hæmatite, supposed to have been used for paint, have been met with in the caves of France, Tablet 8, Case B 13,* and in the Swiss lake-settlements, Tablet 31, Case B 27.† No. 14 (S and D 540) is a similar object of hæmatite to No. 13, Ohio; this specimen shows wear upon the under surface. No. 15 (S and D 542) is an irregularly-shaped mass of hæmatite, exhibiting traces of rubbing at various parts, perhaps produced in preparing red paint; it was found in Ohio.

No. 16 (S and D 524) is a geode of impure red hæmatite of oval form, with similarly shaped sandstone core; the natural form of this object possibly suggested its use as a plummet; Ohio. No. 17 (S and D 531) is part of a plummet-like object of gneissoid rock, Ohio. No. 18 (S and D 530) is a similar object to No. 17,

FIG. 92.

FIG. 91.

FIG. 93.

made of limestone, Virginia. No. 19 (S and D 523) is a portion of a similar object, with worked knob at one end; it is made of gneissoid rock, Virginia. No. 20 (S and D 529) is a similar object of limestone, Florida. No. 21 (S and D 525) is a plummet-like object of hæmatite, grooved at the lesser end, Fig. 91, Ohio. No. 22 (S and D 526) is a plummet-like object of talc, grooved at one end, and with the other end worked to a corresponding blunt point, Fig. 92, Ohio. No. 23 (S and D 527), Fig. 93, is a fusiform object of quartzose rock, grooved at one end like Nos. 21 and 22. This specimen

* See page 52.
† See page, 169.

has a projecting ridge carried round the middle, and is ornamented with lines of red paint. The straight side shown in the figure is flattened. No. 24 (S and D 534), object of highly ferruginous mica schist (?), Ohio. No. 25 (S and D 532), object of hæmatite, of a double conoïd form, with a groove worked round the middle, Fig. 94, Ohio. These pendants, according to Squier and Davis, are of frequent occurrence in the vicinity of the ancient earthworks, but have seldom been found in the mounds themselves, and, even when so found, probably belong to a secondary interment.

FIG. 94.

No. 22, Fig. 92, is of the more usual type; the original measures three inches and a half in length by an inch and a quarter in its greatest diameter; and weighs about four ounces. The use of these plummets as net-sinkers and as ear ornaments has been suggested; they are probably too carefully finished to have been used for the former purpose, and too heavy to admit of their being applied to the latter use. Schoolcraft, however, has figured a fisherman's stone-sinker in use among the Pennakook Indians, New Hampshire, which closely resembles Fig. 91 in form; it measures three inches and one-eighth in length, and its greatest diameter is one inch and three-eighths.*

In the Museum of the East India Society at Salem, Massachusetts, several ancient pendants, found in making some excavations in that city, are preserved. They are larger and of ruder workmanship than those in the Blackmore Collection. A pendant, two inches and a half in length, one inch in diameter in the centre, and grooved at one end, composed of pieces of copper, rudely hammered together, with little slips of silver inserted in the crevices, was found in a mound at Marietta, Ohio, in June, 1819. With it were associated some pieces of copper tube and a lump of red hæmatite; the pieces of tube were near the side of the skeleton, the pendant and the hæmatite near the feet.† These objects are preserved in the Museum of the American Antiquarian Society, Boston. In the same collection is a pendant of hæmatite, found in making the Louisville and Portland Canal, in 1827.‡ Another pendant of quartz crystal,

* 'Archives of Aboriginal Knowledge,' vol. iv., p. 175, plate xxii., fig. 2.

† These objects were presented by Dr. Hildreth to the American Antiquarian Society. See 'Proceedings,' April 29, 1868, p. 45.

‡ It was presented by Mr. S. S. Goodwin. 'Proceedings Amer. Antiq. Soc.,' No. 49, April 29, 1868, p. 47.

found in Cincinnati, is preserved in the Museum of the Philosophical Society of Philadelphia.*

Nos. 26 to 28 are discoïdal stones, hollowed on both sides, and having a central perforation. No. 26 (S and D 464) is of quartzose rock; when perfect it must have measured about four inches in diameter; it is two inches and a quarter in thickness, and was found in Ohio. It is the most highly finished of the three specimens in the Collection. No. 27 (S and D 470) is of greenstone; it measures three inches and seven-eights in diameter, and is two inches in thickness, Ohio. No. 28 (S and D 468), Fig. 95, is of quartzose rock; it measures two inches and three-quarters in diameter, and is an inch and a quarter in thickness. Objects similar to these specimens have been found in different parts of the continent of America, from the valley of the Ohio to Peru.† They are of various sizes, ranging from two to six inches in diameter, and are usually worked with great symmetry, and well polished. None of these objects were found in either of the mounds examined by Squier and Davis; but Schoolcraft mentions the discovery of two, in one of the minor mounds on the Grave Creek Flats, Ohio. One of these specimens is three inches and three-fifths in diameter, the other is only one inch and three-tenths; both are said to be of yellow porphyry.‡ On the Ohio and along the Gulf, such stones were in common use for playing certain favourite games. Beyond the Mississippi this use of them is still retained.§

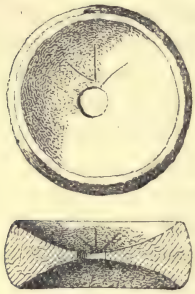

FIG. 95.

Schoolcraft suggests that these ancient specimens were used as quoits, and that the object in hurling them was to cover an upright peg, driven into the ground.‖

The Rev. J. B. Finley states, that among the tribes with whom he was acquainted, stones identical with those above described were much used in a popular game resembling the modern game of "ten-pins." The form of the stones suggests the manner in which they were held and thrown, or rather

* 'Anc. Mon. Miss. Valley,' pp. 235, fig. 132.

† Ibid., p. 221, fig. 121.

‡ 'Trans. Amer. Ethnol. Soc.,' vol. i., pp. 406, 407.

§ 'Anc. Mon. Miss. Valley,' p. 222.

‖ 'Archives of Aboriginal Knowledge,' vol. i., pp. 82, 83.

rolled. The concave sides received the thumb and second finger, the forefinger clasping the side. Du Pratz notices the same game, and fully explains the purpose of the oblique-edged stones. These, when rolled, would describe a convolute figure. The lines on the stones, resembling bird-tracks, Fig. 95, were probably in some way connected with "counting" the game.

The warriors have another favourite game, called *Tchung-kee.* This is played upon a level piece of ground near their state-house, which is kept well cleaned, and over which fine sand is strewed when requisite. Only one or two on a side play at this game. They have a stone about *two fingers broad at the edge and two spans round*; each party has a pole about eight feet in length, smooth and tapering at each end, the points flat. The players set off abreast of each other, at six yards from the edge of the playing ground, and one of them rolls the stone on its edge, in as direct a line as he can, a considerable distance towards the middle of the other end of the ground. When they have run a few yards, each darts his pole after the stone. Should either spear touch the stone, the player counts two of the game; and in proportion to the nearness of the poles to the mark, one is counted, unless by measurement both are found to be an equal distance from the stone. In this manner they will continue running most of the day at half speed, under the violent heat of the sun, staking their silver ornaments; their nose-, finger-, and ear-rings; their breast-, arm-, and wrist-plates, and even their wearing apparel. *All the American Indians* are much addicted to this game, which appears to be a task of stupid drudgery; it seems, however, to be of early origin, when their forefathers used diversions as simple as their manners. The hurling stones, which they still use, have been, from time immemorial, rubbed smooth on the rocks, and with prodigious labour; they are kept with the strictest religious care from one generation to another, and are not buried with the dead. They belong to the town where they are used, and are carefully preserved.*

Another writer mentions that:—

"The warriors practice a diversion, which they call the *game of the pole*, at which only two play at a time. Each pole is about eight feet in length, resembling a Roman 'f,' and the game consists in rolling a flat round stone, about three inches in diameter and one inch in thickness, *with the edges somewhat*

* Adair, 'History of American Indians,' p. 402; quoted by Squier and Davis, *l.c.*, p. 223, *note.*

sloping, and throwing the pole in such a manner that when the stone rests, the pole may be at or near it. Both players throw their pole at the same time, and he whose pole is nearest the stone counts one, and has the right of rolling the stone.*

Breckenridge† mentions a similar game as being popular among the Arikara (Ricarees). It was played with a *ring of stone*. According to Catlin,‡ the game of *Tchung-kee* was almost unceasingly indulged in by the Mandans, in fine weather. It was played near the village, on a pavement of clay, which had been used for that purpose until it had become as smooth and hard as a floor. Two champions form their respective parties. The game commences with two (one from each party), who start off at a trot, abreast of each other; one of them rolls a *stone ring*, two or three inches in diameter, upon the pavement, and each one follows it with his *Tchung-kee* (a stick six feet in length, with pieces of leather about an inch in length projecting from its sides) which he throws before him as he runs, sliding it along upon the ground after the ring, endeavouring to place it in such a position when it stops that the ring may fall upon it, and receive one of the little projections of leather through it, which counts one, two, or four, according to the position of the leather upon which the ring is lodged.

In another description of this game we read:—

"From the first to the second chief's lodge, a distance of about fifty yards was covered with timber smoothed and joined so as to be as level as the floor of one of our houses, with a battery at the end to stop the rings. These rings are of clay stone, and flat, like the chequers for draughts, and the sticks are about four feet in length, with two short pieces at one end in the form of a mace, so fixed that the whole will slide along the board. Two men place themselves at one end, each provided with a stick, and one of them with a ring; they then run along the board, and about half-way slide the sticks after the ring."§

According to Bartram, a large open space in the centre of the Creek villages was called the *Chunky-Yard* by the traders; it was very level, and sunk two, sometimes three, feet below the banks or terraces which surrounded it. These terraces served as seats for spectators. Although this *Chunky-Yard* was used for all public gatherings, for burning or torturing captives, &c.,

* Du Pratz, 'Hist. of Lousiana,' 1720, p. 366.

† 'Views of Louisiana,' p. 256.

‡ 'North American Indians,' vol. i., p. 132.

§ Lewis and Clarke, *l.c.*, p. 105.

yet its name was probably derived from the circumstance that there the game of *Tchung-kee* was played.*

The game of the javelin among the Paunees is analogous to that of *Tchung-kee*. There are two players, each provided with a dart. They select the smoothest plot of grass they can find, about fifty yards in length. They start from one end at full speed; one of the players has a small hoop, six inches in diameter, which, as soon as they have reached the middle of the course, he rolls before them; and each player endeavours to dart his weapon through the hoop. He who succeeds counts so many in the game; and if neither is successful, the nearest javelin to the mark is allowed to count.†

Morgan has also described this game of javelins, *Gä-na'-gä-o.*‡ Discoïdal stones, resembling those shown in the Blackmore Collection, are found in abundance in Chili, some of which may have been used for arming clubs. "In the plains and upon the mountains," says Molina, "are to be seen a great number of flat circular stones, of five or six inches in diameter, with a hole through the middle. These stones, which are either of granite or porphyry, have doubtless received this form by artificial means, and I am induced to believe that they were the clubs or maces of the ancient Chilians, and that the holes were perforated to receive the handles."§

No. 29 (S and D 467) is a disc of felstone, found in Ohio, with a central depression upon the two surfaces; these depressions have been made by "pecking;" the tool-marks are plainly to be seen. This specimen resembles No. 30, Case A 26, which was found on the bank of the river Bann, Ireland. The sides of the American disc are rather more straight than those of the Irish specimen. No. 30 is a drilled object of trachyte, found in Missouri; it is of the form usually called a "net-sinker."‖ Similar specimens, from Ireland, are shown in Case A 26. No. 31 (S and D 465) is a "spindle-whorl"¶ of fine-grained trachyte, Ohio. No. 32 (S and D 467) is a

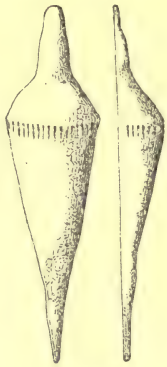

FIG. 96.

* 'Trans. Amer. Ethnol. Soc.,' vol iii., part 1, pp. 34—36, pp. 51—57.

† Hon. C. A. Murray, 'Travels in North America,' vol. i, p 321.

‡ 'League of the Iroquois,' pp. 299—302.

§ Molina, vol. i., p. 56. See ante. p. 95. ‖ Pages 94—96. ¶ Page 94.

sandstone disc, found in Ohio, ornamented on the two surfaces with an incised cross, inscribed within a circle; this object is probably rather modern. No. 33 (S and D 525) is a piece of whetslate, which appears to have formed part of a whetstone, Ohio. No. 34 (S and D 561) is a piece of whetslate, which illustrates the mode adopted in working the material; it was sawn partly through from each side, and then fractured along the weakened line. No. 35 (S and D 493), Fig. 96, is of whetslate, marked upon its upper convex edge with twenty-eight notches. The length of this object is five inches and a half; its greatest breadth is one inch and a half; it was found in Ohio.

A 49.

The stone tubes, Nos. 1 to 4, are described at page 475.

Nos. 5 to 12* (S and D 484, 485, 481, 482, X, 480, 486, 483) are drilled stone axes, probably used as weapons of parade; the material is too soft for any useful purpose, and the haft-holes

FIG. 97.

FIG. 98.

are so small that the handles would be very liable to break. See No. 6 (S and D 485), Fig. 97; No. 9, Fig. 98; No. 10 (S and D 480), Fig. 99; No. 11 (S and D 486), Fig. 100; No. 12 (S and D 483), Fig. 101. No. 6 is from Massachusetts; the other specimens are from Ohio.

No. 5 (S and D 484), and No. 6 (S and D 485), Fig. 97, appear to be unfinished; the drilled hole has been commenced on one side of No. 5, and on both sides of No. 6. The circular striæ are to be seen inside the holes in both specimens; a hollow tool was not used in making the perforations, for the

* Nos. 5 and 10 are of clay slate; No. 6 of felspathic greenstone; Nos. 7, 8, 9, 11, 12, of whetslate. The material of No. 10 closely approaches whetslate.

bottom of each hole is rounded; perhaps hollow drills were used in perforating Nos. 7, 9, 10, 11, and 12.

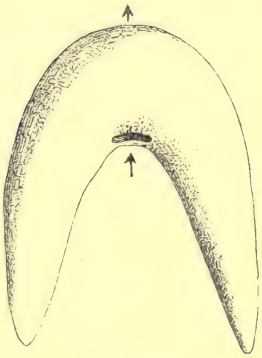

FIG. 99.

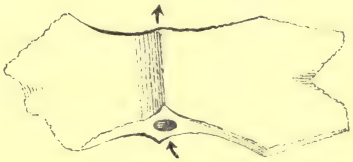

FIG. 100.

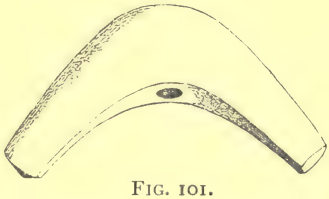

FIG. 101.

In North America the grooved tomahawk was, prior to the occupation by Europeans, the prevailing implement of the axe kind. American drilled axes are uncommon. They are usually small, and, as before mentioned, were probably used as weapons of parade. The haft-holes are exceedingly regular, and the annular striæ can often be plainly seen. Several axes, only partially drilled through, and made of hard varieties of

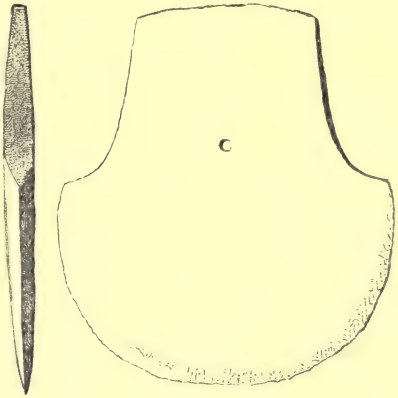

FIG. 102.

stone, have been met with in America. One of these, found in Western Massachusetts, and now in the collection of Dr. Davis,

has been figured.* This axe has been drilled half-way through its substance; the core at the bottom of the hole shows that a hollow drill was used. Mr. Rau has expressed the opinion that these partially drilled axes *are* finished implements, and that they were intended to be hafted by having handles driven as far as possible into the hole. It is, however, probable that they should be classed with the numerous unfinished axes which have been found in Europe in almost every stage of completion.

No. 13 (S and D 495), Fig. 102, is a flat axe or hoe of fine-grained greenstone (aphanite), with a small drilled hole. A similar specimen, found in South Carolina, has been figured.†

The stone "gorgets," Nos. 14 to 33, and the specimens, Nos. 34 and 35, in this Case, are noticed at pages 476 to 479.

A 50.

No. 1 (S and D 489) is a carved object of whetslate, 𝔄,‡ of bird-like form, found in Ohio. No. 2 (S and D 488) is a similar object, of green chlorite, found in Virginia. No. 3 (S and D 487) is another example, made of whetslate, found in Ohio, Fig. 103. In point of size these specimens are nearly alike, being about five inches and a quarter in length, with an average breadth of about three-quarters of an inch. Very many examples of these objects have been met with in the States of Virginia, Ohio, Kentucky, Tennessee, Illinois, and Indiana. They are frequently made of the variety of slate (whetslate) mentioned at page 414. They have holes perforated diagonally at the lower corners, as may be seen in Fig. 103; these holes usually show wear from friction. Squier and Davis consider that these objects have been worn as amulets, or as badges of distinction.§

Fig. 103.

* Charles Rau, 'Drilling in Stone without Metal,' in 'Smithsonian Report,' 1868, p. 5, fig. 7.

† Schoolcraft, 'Archives of Aboriginal Knowledge,' vol. ii., p. 89, plate xliv., fig. 3.

‡ See page 414.

§ 'Anc. Mon. Miss. Valley,' p. 239, fig. 138.

Schoolcraft classes them as knife-handles,* "designed to confine the cutting edges of flinty or obsidian blades."†

No. 4 (S and D 589) is a pipe-bowl of green chlorite, in the form of an owl, Figs. 104, 105, found in Virginia.

FIG. 104.

FIG. 105.

No. 5, 𝔅 var.‡ (S and D 617), Fig. 106, was found within an ancient enclosure, twelve miles below the city of Chillicothe. It is a smoking-pipe; the bowl rises from the centre of the back of a human-headed bird, and communicates with a hole drilled at the side for the insertion of a stem. It measures four inches and three-quarters in length.§ Squier and Davis consider that this object is a relic of the mound-builders; but it does not appear that any pipe of similar form, or indeed *any* pipe intended to be smoked by means of an inserted stem,‖ has been found in either of the Ohio mounds.

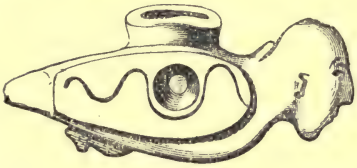

FIG. 106.

The stone hatchet, No. 6, is noticed at pages 370 and 452.

The stone smoking-pipe, No. 7, is noticed at page 451.

* 'Archives of Aboriginal Knowledge,' vol. ii., p. 90, plate xlv., figs. 1, 2.

† Schoolcraft, *l.c.*, vol. iv., p. 175, plate xxiii., fig. 2.

‡ See page 415.

§ 'Anc. Mon. Miss. Valley,' p. 248, fig. 148.

‖ See ante page 485, *note.*

No. 8 (S and D 583), Fig. 107, is a smoking-pipe of green chlorite. A similar pipe, which formed part of the Klemm Collection, is preserved in the Christy Museum. No. 9 (S and D 588) is a smoking-pipe (?) of green chlorite, found in Virginia. It is either unfinished, or was not intended for the use suggested; the stem is not drilled, and there is a hole near the bottom of the bowl, which does not communicate with the supposed tube. In form this object somewhat resembles the ordinary European clay pipes. No. 10 (S and D 585) is a white granite pipe-bowl, intended to be used with a tube; it was ploughed up near Paint Creek, Ohio, in the vicinity of one of the large "enclosures;" but it probably cannot be classed as a relic of the mound-builders. This specimen is much weather-worn.* No. 11 (S and D 79) is a pipe-bowl of burnt clay, found in a mound in Mississippi; it is probable that both Nos. 11 and 12 were associated with secondary interments; they were each intended to be used with a tube. No. 12 (S and D 80), is a pipe-bowl of burnt clay, found in a mound in Alabama.†

FIG. 107.

In former times the Iroquois made pipe-bowls of pottery with considerable skill and taste. Examples of these have been exhumed from the ancient burial-grounds. The Iroquois excelled in the manufacture of a black ware, some of the pipe-bowls made of which are said to be nearly as hard as marble. The bowls are usually ornamented with a pattern in lines, although they are sometimes made in the form of a human face, or in that

* This specimen is engraved in the 'Anc. Mon. Miss. Valley,' p. 228, fig. 127.

† Some pipe-bowls of baked clay are figured in the 'Anc. Mon. Miss. Valley,' p. 194, figs. 76, 77, and 80. One of these is in the form of a human head (fig. 77). It was ploughed up in Virginia, at a point nearly opposite the mouth of the Hocking river. Another has the representation of an animal's head attached to the bowl (fig. 76). It was found with the former specimen. The two clay pipe-bowls represented by fig. 80 are of simple form, somewhat like the specimens, Nos. 11 and 12, Case A 50. One of these was found in a mound in Florida, and is now in the Museum of the Historical Society of New York; the other is from a mound in South Carolina, and is in the collection of Dr. S. G. Morton, of Philadelphia.

of a dog's head. In later times the Iroquois made their pipe-bowls of soft varieties of stone. All these pipes were smoked by means of an inserted tube.*

FIG. 108.

No. 13 (S and D 586) is a pipe-bowl of quartz rock, of an egg-shaped form, found in Ohio. No. 14 (S and D 587) is a pipe-bowl of coral, of similar shape to No. 13. Nos. 13 and 14 were both intended to be used with a tube.

A 50.

No. 15, ℭ,† (S and D 573), Fig. 108, is in the form of an animal's head, possibly intended for that of the elk. This object is completely hollowed out on the under side, leaving a thin shell of material, about one-tenth of an inch in thickness. There are small holes drilled at the root of each ear, and another hole is drilled from the interior through the crown of the head.‡

A 50.

No. 19 ℭ, (S and D 574) is part of a ring carved with great accuracy, and highly polished. These rings usually measure about two inches and three-quarters in diameter, and are about half an inch in thickness. They are deeply grooved upon the outer edge, and are pierced by eight small holes, at equal distances from each other, all converging to the centre. Several rings of rather larger dimensions were obtained, some years since, from a mound at Cincinnati. Similar rings, of smaller size, made of bone, have also been found.§ No. 20 is a cast representing No. 19 restored.

The perforations and hollows of the mound-pipes, and of some other objects, are drilled with extreme accuracy, showing that the tool used was not merely turned between the hands, but was moved by an arrangement probably resembling the "bow-drill" used by watchmakers and others. The ordinary "bow-drill" consists of a straight tool, which passes through the centre of a disc grooved on the outside, motion being imparted

* 'League of the Iroquois,' pp. 354—357.

† This letter (ℭ) refers to the classification of materials proposed by Professor Church, at page 416.

‡ 'Anc. Mon. Miss. Valley,' p. 258, fig. 163.

§ Ibid., p. 224.

to the tool by means of a bow, the string of which is made to encircle the disc. It appears probable that a ring, such as No. 19, may have formed part of a drilling apparatus somewhat of this kind.*

Nos. 16 to 18, 23 to 26, and 28 to 30, are fragments of stone smoking-pipes, from Mound No. 8, "Mound City," shown to illustrate the mode of drilling practised by the mound-builders.†

No. 21 (S and D 715), Fig. 109, is a thin tablet of clay slate, one inch and seven-eighths in length, one inch and a quarter in width, and rather more than an eighth of an inch in thickness. It is perforated with five large and six small holes, and was found in Ohio.

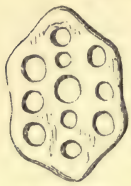

FIG. 109.

No. 22 (S and D 716) is also of clay slate; it was found in Ohio, and is pierced with seventeen holes; see Fig. 110. It measures two inches and seven-eighths in length; its greatest breadth is one inch, and it is of the same thickness as No. 21.‡ No. 27 (S and D 584) is a piece of green chlorite, considered by Dr. Davis to be the roughly blocked out commencement of a smoking-pipe of the mound type. The tablets Nos. 31 and 32 are noticed at page 437; Nos. 33 and 34, at page 371; Nos. 35 to 37, at page 437. No. 38 is a limestone pipe, found near Lake Michigan, about the year 1846, by Mr. Thomas Parker, upon the site of an Indian (Winnebago?) encampment, in the township of Caledonia, Racine county, Wisconsin. It was presented to the Collection by Mr. G. Wing.

FIG. 110

No. 39 are pieces of molten copper, taken from the "altars" of the Ohio mounds.

No. 40 are pieces of galena from the "altars."

"CALUMET IDOLS."

H 14.

Pipes such as those upon Case H 14 have been termed

* See Rau, 'Drilling in Stone without Metal,' 'Report of the Smithsonian Institution,' 1868, pp. 7, 8.

† Nos. 16, 17, 28, and 29, are of limestone; Nos. 18 and 30 of 𝔅, see page 415; Nos. 23 and 24 of 𝔅, dark var.; Nos. 25 and 26 of 𝔅, light var.

‡ Professor Church has suggested that the tablets, Nos. 21 and 22, were used as gauges, or were in some way connected with working in thread.

"Calumet Idols" by Dr. Davis; being of too large a size for common use, they were probably reserved for ceremonial purposes. No "Calumet Idols" have been found in either of the mounds of Ohio.

No. 1 (S and D 582).—Cast of a "Calumet Idol" in the form of a bird. The original is made of a micaceous stone, or perhaps of ℂ.* It was found in Illinois, and is now in the museum at St. Louis. No. 2 (S and D 579).—Cast of a "Calumet Idol," in the shape of a bird with the wings slightly extended. The

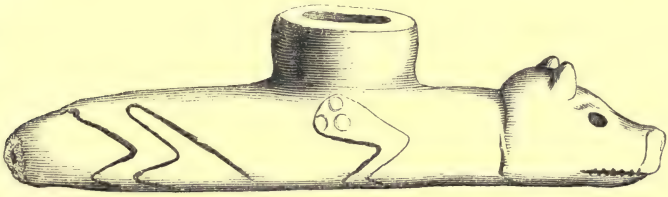

FIG. 111.

original is of greenstone, and was ploughed up in Tennessee. No. 3 (S and D 581), Fig. 111, is a "Calumet Idol" of chlorite, ℂ, in the form of an animal, and was found in Ross county, Ohio. It measures eleven inches and three-quarters in length, and is three inches in height at the bowl. In working out

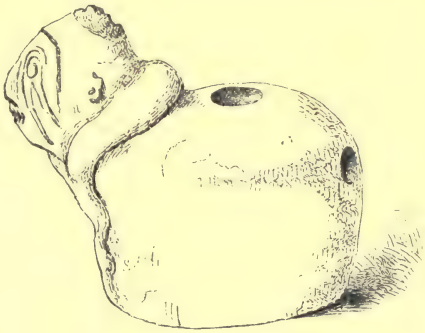

FIG. 112.

the bowl a tool with a sharp point has been used. No. 4 (S and D 576), Fig. 112.—"Calumet Idol," of slightly ferruginous sandstone, found near Paint Creek, Ross county, Ohio. It is

* See page 416.

five inches and a half in length, and about five inches in height. A snake is folded round the neck of the figure. The head of the figure is surmounted by a knob, like the scalp-lock of the Indians.* Incised markings are to be noticed upon the face, somewhat resembling the markings upon the faces of the heads sculptured upon the "Mound" pipes Nos. 9 and 10, Case C 39, Figs. 75 to 77.†

No. 5 (S and D 578).—Cast of stone "Calumet Idol," in the form of a frog. The original was found in Indiana, and is preserved in the collection of Dr. Locke, of Cincinnati. No. 6 (S and D 577).—Cast of a light-coloured sandstone "Calumet Idol," representing a human figure resting upon its knees and elbows. The original, which has been figured,‡ is preserved in the collection of Mr. J. Van Cleve, Dayton, Ohio; it was found in digging a mill-race, three feet below the surface, on the west bank of the Miami river, near the village of Tippecanoe, Miami county, Ohio. It measures six inches in length, and is about six inches in height.

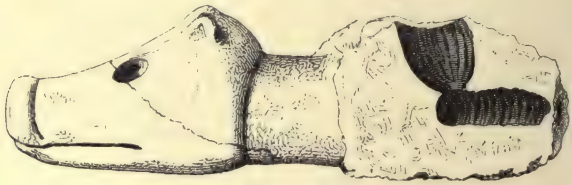

FIG. 113.

A 50.

No. 7 (S and D 580), Fig. 113, is part of a "Calumet Idol," representing the head of some animal. Like No. 3, Case H 14, it is of chlorite, ℭ. It was found to the north-east of Paint Creek, Ross county, Ohio; the fragment measures seven inches and a half in length. The circular striæ left by the drill are to be seen in the tube; at the end of the bore there is a core still

* This pipe is figured in the 'Anc. Mon. Miss. Valley,' p. 248, fig. 148, and in Squier's 'Aborig. Mon. Miss. Valley,' in 'Trans. Ethnol. Soc.,' vol. ii., p. 193. A "calumet idol," with a similar scalp lock to that upon No. 4, was found near Grave Creek, Virginia, and has been described by Schoolcraft in 'Trans. Amer. Ethnol. Soc.,' vol. i., p. 408. A very indifferent figure of this specimen accompanies the description.

† Page 432.

‡ 'Anc. Mon. Miss. Valley,' pp. 247, 248, fig. 146.

attached, which shows that the drilling was effected with a hollow tool. The bowl appears to have been excavated with a pointed implement, as in the case of the pipe No. 3, Case H 14.*

A "Calumet Idol" of grey sandstone is preserved in the Museum of the Historical Society of New York, but its history is unknown.†

A "Calumet Idol," representing a seated human figure, was found on some rocks near the old Indian trail leading from the present site of Brownsville to the Ohio river. This pipe is eleven inches in length by four and a half in breadth, and is formed of coarse sandstone.‡

Smoking-Pipes.

Smoking with the North American Indian was a matter of considerable importance, and even his treaties were not binding without the introduction of the pipe.§ The "calumet," or pipe of peace, is distinguished from ordinary pipes by the fan-like ornament of six or eight eagle feathers which is suspended from it. Each tribe has but one calumet; this is always kept carefully enveloped in bands of skins, and is regarded with reverence as a sacred thing.‖ Wherever the Indian goes, in peace or war, and whatever he does, his pipe is his constant companion. He draws consolation from it in hunger, want, and misfortune; and "when fair skies betide him"—his invariable phrase for good fortune—it is the pipe to which he appeals, as if every puff of the weed were an acceptable oblation to the Great Spirit.¶ He imagined that the incense of tobacco was pleasing to the Great Spirit, and he accordingly offered it to him; thus during the sacrifice of the "White Dog," as the body was being consumed, leaves of tobacco were thrown into the fire from time to time.**

The Iroquois believed that tobacco was given to them as a means of communication with the spiritual world. By burning

* The pipe No. 7, A 50, is figured in the 'Anc. Mon. Miss. Valley,' p. 258, fig. 162.

† 'Anc. Mon. Miss. Valley,' p. 249, fig. 149.

‡ 'Archives of Aboriginal Knowledge,' vol. i., p. 79, plate 13. figs. 1—3.

§ The practice of smoking tobacco appears to be an aboriginal American discovery. See pp. 315—320.

‖ Abbé M. Domenech, 'Seven Years' Residence in the Deserts of N. America,' vol. ii., p. 274.

¶ Schoolcraft, 'Archives,' &c., vol. iii., p. 69.

** 'League of the Iroquois,' p. 219.

tobacco they could send up their petitions with its ascending incense to the Great Spirit. Without this instrumentality, the ear of *Hä-wen-ne'-yu* could not be gained.*

The Shoshonees take off their moccasins before they smoke with a stranger—a custom supposed to imply that they imprecate upon themselves the misery of going barefoot if they should prove faithless to their words; a severe penalty to those who rove over the thorny plains of their country.†

Some of the North American ceremonies connected with smoking are very curious.

"After the Shoshonees had taken off their moccasins, and had requested the Whites to do the same, the Chief lighted his pipe at the fire, and, after making a speech, pointed the stem towards the four cardinal points, beginning with the east and ending with the north. After this ceremony, he presented the stem in the same way to Captain Lewis, who, supposing it to be an invitation to smoke, put out his hand to receive the pipe; but the Chief drew it back, and continued to repeat the same offer three times; after which he pointed the stem, first to the heavens, then to the little circle in which the fire had been kindled, took three whiffs himself, and presented it again to Captain Lewis, who smoked it, passed it to each of the white men; and, after they had each smoked, it was handed to the Shoshonee warriors."

This pipe was made of a dense, but almost transparent, greenstone, very highly polished, about two inches and a half in length, and of an oval form, "the bowl being in the same situation" (line?) with the stem. A small piece of burnt clay was placed at the bottom of the bowl, to separate the tobacco from the end of the stem. "This was of an irregular round figure, not fitting the tube perfectly close, in order that the smoke might pass with facility." The tobacco used by the Shoshonees is of the same kind as that used by the Minetares, Mandans, and Ricarees of the Missouri. The Shoshonees do not cultivate tobacco, but obtain it from the Rocky Mountain Indians, and some of the bands of their own nation who live farther south.‡

In the "Medicine" ceremonies of the Paunees, the first whiff of the pipe is puffed upward in honour of the Great Spirit, and

* 'League of the Iroquois,' p. 164.

† Lewis and Clarke, *l.c.*, p. 266.

‡ Ibid., p. 267.

generally the two succeeding whiffs are sent, one on the right and the other on the left, to the Buffalo Spirit and the Earth.*

At a council held by Lewis and Clarke with the Teton Okandandas (a branch of the Sioux Indians), a vacant space of about six feet in diameter was left in the midst of the assembly; in it was placed the pipe of peace, raised on two forked sticks, about six or eight inches from the ground, and under it the down of the swan was scattered. The chief, after sacrificing a dog, held up the pipe of peace, and first held it pointed to the heavens, then to the four quarters of the globe, and then to the earth; after which he made a short speech, lighted the pipe, and presented it to Captains Lewis and Clarke.†

The Mandans repose implicit belief in a certain "medicine" stone; it is their great oracle, and whatever it announces is believed with implicit confidence. Every spring, and on other occasions during the summer, a deputation visits the sacred spot, where there is a thick porous stone, twenty feet in circumference, with a smooth surface. Having reached the place, the ceremony of smoking to it is performed by the deputies, who alternately take a whiff themselves, and then present the pipe to the stone; after this they retire to an adjoining wood for the night, during which it may be safely presumed that all the embassy do not sleep; and in the morning they read the destinies of the nation in the white marks on the stone, which those who made them are at no loss to decipher. The Minetares have a stone of a similar kind, which has the same qualities and the same influence over the nation.‡

When the Omahas hunt the buffalo, a man on foot, bearing a pipe, precedes the mounted hunters. After the party has approached as near to the herd as they suppose the animals will permit without taking alarm, they halt to give the pipe-bearer an opportunity of performing the ceremony of smoking, which is considered necessary to the success of the hunters. He lights his pipe, and remains a short time with his head inclined, and the stem of the pipe extended towards the herd. He then smokes, and puffs the smoke towards the bisons, towards the heavens and the earth, and finally to the cardinal points successively. These last they distinguish by the terms sunrise, sunset, cold country, and warm country; or they designate them

* Murray, 'Travels in America,' vol. i., p. 335, p. 462.

† Lewis and Clarke, *l.c.*, pp. 62, 63.

‡ Ibid., p. 121.

collectively by the name of the four winds, *Ta-da-sa-ga-to-ba.**

With the North American Indians the medicine pipe-stem carrier is an official of great dignity, and a highly-ornamental tent is provided for his use. A bear-skin robe is set apart for wrapping up the medicine pipe-stem when carried, and for laying it on while exposed to view. When wrapped up in its covering, it is usually borne by the favourite wife of the dignitary, while he himself carries the medicine bowl, out of which he takes his food. But although the sacred pipe-stem is almost invariably borne by the wife of the Indian dignitary, it is never allowed to be uncovered in the presence of a woman; and should one, even by chance, cast her eyes on it when thus exposed, its virtues can only be restored by a tedious ceremony, designed to counteract the evil effects and propitiate the insulted spirit. If the stem should fall to the ground, whether designedly or from accident, it is in like manner regarded as an omen of evil, and many elaborate ceremonies have to be gone through before it is reinstated in its former favour and beneficent influence. Mr. Kane met with a young Cree half-breed, who confessed to him that, in a spirit of daring scepticism, he had once secretly thrown down the medicine pipe-stem and kicked it about; but soon after its official carrier was slain, and such misfortunes followed as to leave no doubt, on the mind of the narrator, of the awful sanctity pertaining to this guardian and avenger of the honour of the tribe. The sacredness of the medicine pipe-stem attaches in part also to its bearer. Many special honours are due to him, and it is even a mark of disrespect, and considered unlucky, to pass between him and the fire.†

The "Calumet" dance, *Nin-ne-ba-wa-wong*, is a very favourite and remarkable ceremony. The person who intends to perform this dance sends a messenger, bearing a small skin containing enough tobacco to fill a pipe, to the individual he intends to honour. If this is accepted and smoked, a time is appointed for the dance, and the dancers are invited into the lodge of the smoker. After a short time, the "Calumet" is placed upon a forked stick, which is driven into the ground at the back of the lodge. At sunset the "Calumet" is taken from this forked

* Long, 'Expedition from Pittsburgh to the Rocky Mountains.' Philadelphia, 1823, vol. i., p. 208.

† Wilson, 'Prehistoric Man,' vol. ii., pp. 26, 27.

stick, is wrapped in clothes like an infant, and carefully placed in a bed prepared for its reception, a lullaby being sung for its quiet repose. On the following morning it is *awakened* by a song, and again consigned to its forked support. This is repeated until the day appointed for the dance arrives, and indeed throughout the two or three days that the dance frequently lasts. In the course of this dance warriors and braves make presents to the dancers. Each donor strikes a post fixed in the ground, and the music ceases whilst he recounts his martial deeds. The presents made at these dances are sometimes very considerable. *Ongpatonga*, "Big Elk," once danced the "Calumet" to *Tarrarecawaho*, the Grand Paunee chief, and received from him between eighty and ninety horses. In 1820, the Paunees gave one hundred and forty horses to the Otoes, who performed this dance at their village.*

The Sioux Indians smoke what the French traders call *bois roulé*, which is the inner bark of the red willow, dried in the sun or over the fire, and reduced into small pieces by being rubbed between the hands; it is either smoked alone or mixed with tobacco.† Other adulterants are used by the Indians. Thus the Comanches are described as being extravagantly fond of tobacco, which they use for smoking, mixed with the dried leaves of the sumach, inhaling the smoke into their lungs, and giving it out through their nostrils.‡

During a visit to part of the Minnesota territory, at the head of Lake Superior, in 1855, Dr. Wilson fell in with a party of Chippewa Indians, and he mentions that they did not exhale the smoke from the mouth, but from the nostrils. This, he subsequently learnt, is the universal custom of the Indians of the North-west, from the Red River settlement to the shores of the Pacific. By this means the narcotic effects of the tobacco are greatly increased. Indeed, a single pipe of strong tobacco, smoked by an Indian in this manner, will frequently produce giddiness and intoxication. The Indians accordingly make use of various herbs to mix with and reduce the strength of the tobacco, such as the leaf of the bearberry or the cranberry, the inner bark of the red willow (*Cornus sericea*), and of the dogwood (*Cornus alternifolia*), to all of which ingredients the Indian

* Long, *l.c.*, vol. i., pp. 332—334.

† Lewis and Clarke, *l.c.*, p. 65.

‡ Marcy and M'Clellan, 'Exploration of the Red River of Louisiana,' Washington, 1853, p. 102.

word *kinnekinnick*—literally, "he mixes"—is applied. When the leaves of the winter-berry (*Gaultheria procumbens*) are used, the mixture receives the name of *pahgezegun*, which means "anything mixed." Should the Indian's supply of tobacco be exhausted, he will frequently smoke the leaves of the bearberry or cranberry alone.*

The Omahas usually inhale the smoke into the lungs, from which it is gradually expelled again as they converse.†

The custom of increasing the action of the tobacco fumes on the nervous system, by expelling the smoke through the nostrils, appears to have been almost universally practised when the smoking of tobacco was first introduced into the Old World. The Spaniard still expels the smoke through his nostrils, though using a light tobacco and in such moderation as to render the influence of the narcotic sufficiently innocuous. The Greek sailors in the Levant very frequently retain the same practice, with less moderation in its use. Melville mentions that the Sandwich Islanders, among whom tobacco is of recent introduction, have adopted the Indian custom of expelling the smoke from the nostrils. Paul Hentzner, in his "Journey into England," in 1598, among other novelties, describes witnessing at the playhouse the practice of smoking, then newly borrowed from the Indians of Virginia:—"Here," he says, "and everywhere else, the English are constantly smoking of tobacco, and in this manner: they have pipes on purpose made of clay, into the further end of which they put the herb, so dry that it may be rubbed into powder, and, putting fire to it, they draw the smoke into their mouths, which they puff out again through their *nostrils*, like funnels, along with it plenty of phlegm and defluxion of the head."‡

Fairholt gives an engraving, copied from an illustration in a rare little volume, in 12mo, printed at Rotterdam, in 1623.§ It represents a man smoking and expelling the smoke through his

* Wilson, 'Prehistoric Man,' vol. ii., pp. 44, 45.

† Long, *l.c.*, vol. i., p. 332.

‡ Quoted by Wilson, 'Prehistoric Man,' vol. ii., pp. 45, 46. The Germans practise many quaint modes of emitting tobacco-smoke; one accomplishment of this kind consists in breathing the smoke gently forth till it forms a ring, and before it loses that form, sending another ring at right angles through it.—Fairholt, *l.c.*, p. 54, *note.*

§ 'Een Korte beschryvinge van het wonderlycke kruyt Tobacco.' This work is dedicated to an Englishman, "The worthy nobleman, M. Humphry King, Knight, and Chief Sovereign of the Order of Glorious Tobacco."

nose. This custom is also alluded to in the following passage:—"Will your lordship take any tobacco?" to which the sneering reply is,—"'Sheart! he cannot put it through his *nose!*"*

A story, in which allusion is made to this practice, is told of the famous jester, Dick Tarlton, who died in 1588:—"Tarlton, as other gentlemen used at the first coming up of tobacco, did take it more for fashion's sake than otherwise, and being in a roome, sat betweene two men overcome with wine, and they never seeing the like, wondered at it, and seeing the vapour come out of Tarlton's *nose*, cryed out *fire, fire!* and threw a cup of wine in Tarlton's face. 'Make no more stirre,' quoth Tarlton, 'the fire is quenched; if the sheriffs come, it will turne a fine as the custom is.'"†

We learn from several travellers that nearly all the Indian tribes smoke the mixture known as *kinnekinnick.* It is usually composed of the dried leaves of the sumach and the inner bark of the red willow; these are chopped very fine, and with the addition of one-fourth of tobacco, it is said to be a good smoking mixture. The name is supposed to be of Delaware origin.‡

According to one writer, *kinnekinnick*, or, as the Omahas call it, *ninnegahe* (mixed or made tobacco), is composed partly of tobacco and partly of the leaves of the sumach (*Rhus glabrum*); but many prefer to the latter ingredient the inner bark of the red willow (*Cornus sericea*), and when neither of the two latter can be obtained, the inner bark of the arrow-wood (*Viburnum*) is substituted. These ingredients are well dried over the fire, and are rubbed into powder between the hands.§

The American Indian takes great pride in his pipe, and applies the most precious kinds of stone within his reach to pipe-making.‖

* Field, 'Amends for Ladies,' 1618, quoted by Fairholt, *l.c.*, p. 58.

† Fairholt, 'Tobacco and its Associations,' p. 52. A similar and better known story is told of Sir Walter Raleigh. Rich gives still another version of the tale:—"I remember a pretty jest of tobacco, which was this. A certain Welchman coming newly to London, and beholding one to take tobacco, never seeing the like before, and not knowing the manner of it, but perceiving him vent smoke so fast, and supposing his inward parts to be on fire, cried out, 'O Jhesu, Jhesu man, for the passion of Cod hold, for by Cod's splud ty *snowt's* on fire,' and having a bowle of beere in his hand, threw it at the other's face, to quench the *smoking nose.*"—Rich, 'Irish Hubbub,' 1619, quoted by Fairholt, *l.c.*, p. 53.

‡ Murray, 'Travels in N. America,' vol. i., p. 452, *note.*

§ Long, *l.c.*, vol. i., p. 331.

‖ Schoolcraft, 'Archives,' &c., vol. i., p. 72; vol. iv., p. 175.

Sometimes he obtains the material from a considerable distance. Mr. Kane says that, in coming down the Athabaska river, when drawing near its source in the Rocky Mountains, he observed his Assinnaboin guides select pieces of bluish jasper from among the water-worn stones in the bed of the river, to carry home as material for pipes, although they were then fully five hundred miles from their lodges.*

In the Philadelphia Museum there are many Indian pipes of that red indurated stone, "Catlinite,"† which occurs only (as far as is hitherto known) on the Pipe Stone branch of the Little Sioux River of the Missouri. One of these pipes, however, was found on the banks of the Rio de la Plata, in South America, and several were met with in New England and in the north-eastern part of America.‡

This material, the celebrated red pipe-stone of the Coteau des Prairies, is an indurated aluminous stone, coloured with red oxide of iron, and is in a high degree fissile and gritless.§ It has been named by Dr. Jackson "Catlinite,"‖ out of compliment to Catlin, who claims to be the first white man that traced it to its bed, and who made us acquainted with some of the Indian traditions relating to it. According to one of these legends, the Great Spirit called the Indian nations together, and, standing on the precipice of the red pipe-stone rock, broke from it a piece, out of which he made a huge pipe, by merely turning it in his hand.¶ This pipe he smoked over them, and told them that the stone was red—that it was their flesh—that they must use it for their pipes of peace—that it belonged to all, and that the war-club and scalping-knife must not be raised near it. At the last whiff of his pipe his head went into a great cloud, and the whole surface of the rock for several miles was melted and glazed. At that moment two squaws went with a flame of fire under the two medicine rocks, where they remain to this day, and must be propitiated whenever the pipe-stone is to be taken away. The footsteps of the Great Spirit are still to be seen on the rock; the guardian spirit of the place dwells beneath five

* Quoted in Wilson, 'Prehistoric Man,' vol. ii., pp. 14, 15.

† See pages 415, 416.

‡ Long, *l.c.*, vol. i., p. 31.

§ Schoolcraft, *l.c.*, vol. iv., p. 143.

‖ "Catlinite" is a rock and not a definite mineral. It may be regarded as a ferruginous claystone. Its hardness is very low, only about 2 on the scale, so that it is readily scratched, even by calc spar.

¶ The irksome nature of the process of sculpturing the pipe-bowl, even to the patient and stolid Indian, appears to be indicated by this simple statement.

huge granite boulders, and the Indian, by sacrifices of tobacco, entreats permission to take away a small piece of the stone for a pipe.* In accordance with the advancing spirit of the times, the Sioux have, recently, taken entire possession of the quarry of the red pipe-stone.

The Knistenaux have a legend to the effect that a great flood destroyed all the nations of the earth. The tribes of the red men assembled on the Coteau des Prairies to get out of the way of the waters, but they were all drowned, and their flesh was converted into red pipe-stone. Therefore the locality became neutral ground. It belonged to all tribes alike, and all were allowed to quarry the stone and smoke together. While the Indians were all drowning in a mass, a young woman, *K-wap-tah-w*, caught hold of the foot of a very large bird that was flying over, and was carried to the top of a high cliff, not far off, which was above the water. Here she had twins; their father was the war-eagle, and her children have since peopled the earth.†

A specimen of "Catlinite" may be seen in Case E 5, No. 35. The pipe-bowls, Nos. 1, 2, 3, 5, 6, and 7, in the same Case, are also made of this variety of stone.

According to Catlin, the North American Indian makes the hole in the bowl of his pipe by drilling it with a hard stick, and sharp sand and water;‡ and another writer informs us "that the men make bowls and pipes of varieties of sandstone and limestone, which are bored and shaped by the means of friction with harder substances and the use of sand and water. They generally ornament these pipes with some figure characteristic of the owner's name, as, for instance, with that of a buffalo, elk, bear, tortoise, serpent, &c. The large stone mortars, in which they bruise their corn, are made in the same manner."§

The Chippewas, on the St. Louis river, at the head of Lake Superior, a branch of the great Algonkin nation, carve their pipes out of an easily-wrought, dark, close-grained stone, and frequently introduce groups of animals and human figures, with considerable artistic skill.‖

* Catlin, 'North American Indians,' vol. ii., pp. 164, 169. Longfellow has introduced this legend into 'The Song of Hiawatha.'

† Catlin, *l.c.*, vol. ii., p. 168.

‡ 'North American Indians,' vol. i., p. 234.

§ Hunter, 'Manners and Customs of the Western Indians,' Philadelphia, 1823, p. 298.

‖ Wilson, 'Prehistoric Man,' vol. ii., p. 15.

The most elaborate of all the modern specimens of pipe-sculpture are those executed by the Babeen or big-lip Indians.* These pipes are carved from a soft blue claystone or slate. The form is in part determined by the material, which is only to be procured in thin slabs, so that the sculptures wrought on both sides present a sort of double bas-relief. From this material singular and grotesque groups are carved, without any apparent reference to the final destination of the whole as a pipe. The lower side is usually straight; a small hollow is carved out of some protruding ornament to serve as a bowl, and a perforation is drilled to connect this with the end of the pipe. The only addition made to this form of pipe, when in use, is the insertion of a quill or straw as a mouth-piece, instead of a pipe-stem.† Examples of these pipes may be seen in Case E 5, Nos. 26 to 33. Nos. 26 and 27 were presented to the Collection by Mrs. Nutt.

Among the Assinnaboin Indians a fine marble is used for pipe-bowls, much too hard to admit of minute carving, but susceptible of a high polish. This is cut into pipe-bowls of graceful form, and made so extremely thin as to be nearly transparent. When in use the glowing tobacco shines through and presents a singular appearance at night, or in a dark lodge. Another favourite material is a coarse kind of jasper, also too hard to admit of elaborate ornamentation. This is cut into various simple and tasteful designs, executed chiefly by the slow and laborious process of rubbing it down with other stones.‡

A pipe-bowl of nearly transparent rock-crystal, found in a mound near Bainbridge, Ross county, Ohio, is preserved in the Collection of Dr. Davis, but it probably was associated with a secondary interment. Its shape is that of a barrel, somewhat narrowing at the bottom, and it was intended to be used with an inserted stem. The drilled holes in this specimen are rounded at the bottom, showing that the tool employed was a solid body, and not a hollow drill, such as was frequently used by the mound-builders.§

The question of time is usually of no consequence with the savage, and although the drilling of some of the harder varieties

* So called from the women wearing a piece of wood inserted into a slit in the lower lip.

† Wilson, 'Prehistoric Man,' vol. ii, pp. 17—19, figs. 27, 28.

‡ Ibid., vol. ii., p. 14.

§ Rau, 'Drilling in Stone without Metal,' in 'Report of the Smithsonian Institution,' 1868.

of stone, with the sole aid of a stick and sand and water, may appear to us too irksome a task, yet, according to Lafitau, a North American Indian sometimes spent his life in making a stone tomahawk without entirely finishing it.*

The form of the Ohio mound pipes is altogether peculiar, and differs essentially from the other endless varieties of pipes and pipe-bowls wrought by Indian ingenuity.† The numerous antique pipes figured by Schoolcraft‡ and by Lapham§ are in shape wholly unlike the mound-pipes.

Two figures of a pipe of the mound type are given in "The League of the Iroquois;" the original is of black marble, and highly polished. Mr. Morgan says of it:—"This pipe is anomalous. Doubtless it is a relic of the 'mound-builders,' which, having found its way into the hands of a Seneca, was finally buried by his side in the valley of the Genesee, to be again brought to light upon the excavation of the Valley canal. In material and in finish it is unlike and superior to the pipes of the Iroquois."‖

The Indians west of the Rocky Mountains are fond of tobacco, but they appear to have no medicine-pipe, nor have they the marked superstitious pipe usages by which most of the North American tribes are distinguished. The Ahts formerly had plain cedar pipes (*kosh-kuts*), devoid of ornament; but there were also to be found in all the tribes the ornamental blue-stone (Tshimpsean) pipes, which had been obtained in traffic with the Northern Indians. Mr. Sproat considers that Dr. Wilson is wrong in stating¶ that the Clalam Indians inhabit Vancouver Island, and that they have elaborately carved blue claystone pipes of their own manufacture. No such people, according to Mr. Sproat, live in Vancouver's Island, but there is a tribe called the Tsclahllams on the south side of the Straits of Fuca, which perhaps is meant. This tribe probably would only possess carved stone pipes, as articles of traffic received along the coast from the Tshimpsean tribes inhabiting Queen Charlotte's Island, and the shores of British Columbia to the north of Vancouver's Island.**

* 'Mœurs des Sauvages Amériquains,' Paris, 1724, vol. ii., p. 110.

† Wilson, 'Prehistoric Man,' vol. ii., p. 3.

‡ 'Archives of Aboriginal Knowledge,' plate viii., figs. 1—7; plate ix., figs. 1—6; plate x., figs. 1—6.

§ 'Antiquities of Wisconsin,' pp. 83, 84, figs. 39—50.

‖ 'League of the Iroquois,' p. 357.

¶ 'Prehistoric Man,' vol. ii., p. 17.

** Sproat, 'Scenes and Studies of Savage Life,' pp. 269—276. The Indians

E 5.

The modern pipes in this Case are shown for illustration. It will be observed that there is not a single pipe in the entire series of the form of the mound-pipes.

Most of the North American pipe-bowls in Case E 5 are made of the red pipe-stone of the Coteau des Prairies, "Catlinite," already mentioned. No. 35 is an unworked piece of this stone. The bowls of Nos. 1, 2, 3, 5, 6, and 7, are also made of "Catlinite." No. 3 (S and D 46) was the favourite pipe of the eloquent Keokuk, chief of the Sacs and Foxes, whose name occupies a conspicuous place in the Indian history of the North-west.* Some of the North American stone pipe-bowls are ornamented with inlet metal work, such as Nos. 4, 7, and 16; sometimes metal was used for mending a broken pipe, as in the case of No. 9. A few North American pipe-bowls of other varieties of stone are shown, such as Nos. 8 and 15. No. 12 is a tomahawk pipe of black stone. No. 11 is the modern iron representative of this form of pipe. No. 36 is another example, said to be of French workmanship. The tomahawk has a perforated handle, the hole communicating with the pipe-bowl, which is opposite the blade of the weapon; it thus is capable of serving a double purpose. It is worn in the girdle, or is carried behind the back, except in actual battle. The Indian uses it in close quarters with deadly effect, and also throws it with unerring certainty at distant objects, making it revolve in the air in its flight. With the Indian the tomahawk is the emblem of war itself. To bury it, is peace; to raise it, is to declare war.† During the American war the English were compelled to make iron tomahawks after the native pattern, with a pipe-bowl opposite the blade of the weapon, before the Indians could be efficiently armed as allies. ‡

Nos. 26 to 33 are pipes made by the Babeens, and the Indians of Vancouver's and Queen Charlotte's Islands. No. 33 (S and D 618) was found in the Mississippi. Nos. 26 and 27 are from

of the Mission of San Gabriel, California, call tobacco *shu-ke*, and pipe *wickocha*. Their tobacco-pipes are made of reeds.—'The California Farmer,' May 11, 1860.

* 'Anc. Mon. Miss. Valley,' p. 229, fig. 128.

† 'League of the Iroquois,' pp. 363, 364.

‡ Col. A. Lane Fox, 'Primitive Warfare,' in 'Journ. Roy. United Serv. Institution,' vol. xi., No. xlvii., p. 617.

Queen Charlotte's Island, and were presented to the Collection by Mrs. Nutt. No. 21 is a wooden pipe carved in the form of a fish, with an iron receptacle for tobacco. This kind of pipe is in use by the Koloshians, who inhabit from 54° 40′ to Prince William's Sound. No. 21 was presented to the Collection by Captain Oliver Eldridge. No. 10 is a pipe-bowl of black stone from Otaheite. Nos. 17, 18, 22, 23, 24, 25 are stone pipes from Natal, Africa. No. 19 is a clay pipe from Africa, and No. 34 is a clay pipe from the East Indies. The practice of smoking has so completely interwoven itself with North American Indian habits, that the pipe has even left its impress upon the language, and the Indian calculates time according to the period occupied in smoking, causing him to invent such word sentences as *ningopwohgun*—"I was one pipe [of time] about it."*

* 'Prehistoric Man,' vol. ii., p. 30.

STONE MAIZE-CRUSHERS.

H 13.

Nos. 1 to 10 are stone pestles from Ohio.* No. 11 (S and D 444) is a ferruginous sandstone pestle, from Virginia. No. 12 (S and D 449) is a pestle of porphyritic greenstone. No. 13 (S and D 441) is a pestle of ferruginous sandstone. Nos. 12 and 13 were found in New Jersey. No. 14 (S and D 450) is a pestle of greenish slate from Florida. Similar implements are in present use with the Indians for bruising maize. No stone pestles were found in the mounds examined by Squier and Davis.†

C 33.

Nos. 1 and 3 (S and D 455, 456) are stone rolling-pins (metal-piles),‡ found in Florida. Nos. 2 and 4 are stone rolling-pins, found at Warwick, Rhode Island, and presented to the Collection by the Hon. J. R. Bartlett. These objects resemble the corn-crushers, Nos. 6 to 9, Case H 12, from California; and No. 3, Case C 31, from St. Domingo.

The presence of so many corn-crushers in the Collection affords direct evidence that grain formed a regular article of food with the Indian tribes of North America. In Mexico, as has been already mentioned, maize was an important item in the

* The following are of porphyritic greenstone:—Nos. 1 (563), 3 (448), and 5 (447). The following are of quartzite:—Nos. 2 (443), 4 (446), and 8 (452). The following are of greenstone:—Nos. 6 (442) and 7 (445). No. 9 (454) is of quartzose greenstone. No. 10 (453) is of micaceous greenstone.

† 'Anc. Mon. Miss. Valley,' p. 220.

‡ See page 321.

annual tribute exacted from the different provinces of the empire.* It has also been suggested, that the mound-builders could not have assembled in sufficient numbers to undertake and carry out the extensive earth-works, which exist in the middle and eastern parts of the United States, without such an unfailing supply of food as could only have arisen from the practice of agriculture. It may, therefore, be well to inquire into what is recorded of the agricultural habits of the Indians, when they were first brought into contact with Europeans.

The Cultivation of Maize by the North American Indians.

The Indian tribes of North America appear to have cultivated maize from a very remote period. The origin of the practice has been long forgotten, and accordingly the gift of the maize-plant, like every other good gift,† is attributed to the direct agency of the Great Spirit. In their allegories and legends maize is alluded to as a sentient being, and not as a mere plant. According to a Chippewa allegory:—An Indian lad, having reached the age at which it is proper to make the initiatory fast, went away to a retired spot, and prayed that he might dream of something to benefit his people, for he had often seen them suffering from want of food. On the third day of his fast he became very faint and weak, and fancied that he saw a handsome young man, dressed in green robes, and with green plumes on his head, advancing towards him. The visitor said: "I am sent to you by the Great Spirit. Rise and wrestle with me." Weak as he was, the youth tottered to his feet and began to wrestle. After a long trial, the handsome stranger said: "My friend, it is enough for once; I will come again." He then vanished.

On the next day the celestial visitor reappeared and renewed the trial. When departing he said to the young man, "Be strong and courageous; it is the only way in which you can obtain the boon you seek."

* See page 320.

† Thus we find that:—"The master of life and the Good Spirit saw that the Indian needed assistance in the chase, and the dog was given to him, that he might bark and find game. The dog was *not* created here on earth; he was formed in heaven, and sent down to aid the Indian in the chase."—Schoolcraft, 'Archives of Aboriginal Knowledge,' vol. v., p. 193.

On the third day the contest was renewed, and the young man as he wrestled seemed to gain fresh strength. At length the stranger cried, "It is enough; I am beaten. You will win your desire from the Great Spirit. To-morrow will be the seventh day of your fast and the last of your trials. Your father will bring you food which will recruit you. I shall then visit you for the last time, and I foresee that you are destined to prevail. As soon as you have thrown me down, strip off my garments, and bury me on the spot. Visit the place, and keep the earth clean and soft. Let no weeds grow there. I shall soon come to life, and reappear with all the wrappings of my garments and my waving plumes. Once a month cover my roots with fresh earth; by following these directions your triumph will be complete." He then disappeared.

Next morning the youth's father came with food, but the lad asked him to set it by. Presently the sky-visitor came for his final trial, and although the young man had not tasted the food, he yet engaged in the contest with a feeling of supernatural strength. He threw the stranger down, and, stripping off his garments and plumes, he buried his body in the earth, carefully preparing the ground, and removing every weed. He then returned to his father's lodge. From time to time he revisited the burial-place of his friend, and would not let even a wild flower grow there. Soon he saw the tops of the green plumes coming out of the ground, at first in spiral points, then expanding into broad leaves and rising into green stalks, and finally assuming their silken fringes and yellow tassels.

The spring and the summer had now passed, when one day, towards evening, he asked his father to visit the lonely spot where he had fasted. The old man, on reaching it, stood in amazement. The little fasting-lodge was gone, and in its place stood a tall, graceful, and majestic plant, waving its taper leaves and displaying its bright-coloured plumes and tassels. But what most excited his admiration was its cluster of golden ears. "It is the friend of my dreams and visions," said the youth. "It is *Mon-da-min*—it is the Spirit's grain," said the father. And this is the origin of Indian corn.*

The legend of the Susquehannok Indians of the origin of maize has been already mentioned.† According to another legend,

* Schoolcraft, 'Archives of Aboriginal Knowledge,' vol. ii., pp. 230—232. Longfellow has introduced this story into the 'Song of Hiawatha.'

† Pages 316, 317.

maize first grew in heaven, and the Good Spirit commanded it to come upon earth; but, as maize was a sentient being, it felt reluctant to do so, and the Good Spirit said to the maize, "Go down upon earth and do good to the Indian, and he will be good to you in return. The Indian will kill game of every description, and season you with all manner of meat. This will afford you an opportunity of eating the same food with the Indian, while you will be beneficial to him." So maize came down from heaven to benefit the Indian; and for this reason they esteem it, and are bound to take good care of it, and to nurture it, and not raise more than they actually require for their own consumption.

The Miamis were once severely punished for raising an immense crop of maize, part of which they hid under ground, and stored the rest in bags. So great was the crop, that the Miami youths were regardless of its value, and even ventured to throw the cobs of maize at each other in sport. As a punishment, the Good Spirit brought a famine upon the hunters, and although game was abundant, yet none could be killed. One day a young hunter, faint and weary, lost his way in the woods, and at length emerged on the borders of a wide stream. Near its bank was a small lodge. Approaching it, he looked in, and saw that its sole occupant was a very old man. "Oh! my grandfather," said the young hunter, "I am faint and hungry; the people of our village cannot kill any game, although it abounds in the plains and forests. Our people are starving. We have eaten all the maize we have with us, and our elders have sent off their young men this morning to our summer village, to bring in supplies which they have hidden under the ground." The old man replied, "My grandson, the Indians have afflicted me much. Your people have wantonly abused and reduced me to the state in which you now see me. My backbone is broken in many places. It was the foolish young men and youths of your town that have done me this evil. I am *Mon-da-min*, or maize, that came down from heaven, and they played and threw corn-cobs and corn-ears at one another, thus thinking lightly and contemptibly of me. I am the Corn Spirit they have so injured. This is the reason you experience bad luck and famine. I am the cause; you feel my just resentment, and thus your people are punished."

The Indians are now very careful not to play with maize in the ear, nor to break the ears when gathering it. After

the harvest is over,* the maize returns to heaven, the ears that are in good condition come back again the next spring upon earth, if the Indian who raised such maize paid proper attention to it.†

The Iroquois consider that maize, beans, and pumpkins are the special gifts of *Hä-wen-ne'-yu*,‡ and that each kind of plant has been entrusted to the charge of a special guardian spirit. These three spirits are believed to be sisters, very beautiful, and very fond of each other. This triad is known under the name of *De-o-ha'-ko*, which signifies "Our Life," or "Our Supporters." They are never mentioned separately, except by description as "The Spirit of Corn," "The Spirit of Beans," or "The Spirit of Pumpkins," for they have no individual names. There is a legend that maize was originally of easy cultivation, yielded abundantly, and had a grain exceedingly rich in oil. The Evil-minded, being envious of this great gift of *Hä-wen-ne'-yu* to man, went forth into the fields and spread over them an universal blight. Since then maize has been more difficult to cultivate, it yields less abundantly, and has lost its original richness. To this day, when the rustling breeze passes through

* Corn-husking is a season of great hilarity with the Indians. Should one of the young girls find a *red* ear of maize, it is typical of a brave admirer; but if a crooked ear be found, it is the sign of an old and decrepit lover, and all the party join in singing—

Wagemin, wagemin,	Crooked ear, crooked ear,
Paimosaid.	Walker at night.
Bakau kewaizee	Stop, little old man,
Ka saugizzesee.	And take not to flight.
Wagemin, wagemin,	Crooked ear, crooked ear,
Kenabowid,	Stand up strong,
Wagemin, wagemin,	Little old crooked man,
Ningah nugamood.	I'll give you a song.

—Schoolcraft, *l.c.*, vol. v., pp. 563, 564. These *red* ears are not without interest to the American lads and lasses at "husking frolics," for "the man, that has the good fortune to fall upon a *red* ear, is entitled to kiss any of the girls that he pleases. . . . . So there is a constant looking out for these *red* ears." Cobbett, 'A Treatise on Cobbett's Corn,' London, 1828, chap. ix., § 178. In Case A 52, upon Tablet 19, *a* is a grain of red maize; *b* and *c* are grains of yellow maize of different shades. These specimens, grown at Cuzco, Peru, in 1851, were presented to the Collection by Professor Church.

† Schoolcraft, *l.c.*, vol. v., pp. 193—195.

‡ This name of the Great Spirit is an original uncompounded word in the Seneca dialect, and it signifies "a ruler." The Iroquois also recognised the personal existence of an Evil Spirit, *Hä-ne-go-ate'-geh*, the "Evil-minded."—'League of the Iroquois,' p. 156.

the maize field with a moaning sound, the imaginative Indian fancies that he hears the "Spirit of Corn," in her compassion for the red man,* still bemoaning, with unavailing regrets, her blighted fruitfulness.† Maize appears to have been the staple article of consumption among the Iroquois. They cultivated it before the formation of the League, and, according to one of their legends, the maize-plant sprang from the bosom of the mother of the Great Spirit after her burial.‡

The first European warlike expedition into the Seneca country was made by the Marquis de Nonville, in 1687. He says:—"We remained at the four Seneca villages until the 24th July. All that time we spent in destroying the corn (maize), which was in such great abundance that the loss, including old corn which was in *cache*, which we burnt, and that which was standing, was computed at four hundred thousand minots of Indian corn" (1,200,000 bushels).§ This, however, must be regarded as an exaggerated estimate.

According to Schoolcraft, almost all the tribes south of the Gulf of St. Lawrence and west of the Rocky Mountains raised more or less maize.‖ In the Carolinas and Virginia the Indians grew large quantities, and "all relied on it as one

* The Indians appear to consider that this beautiful "Spirit of Corn" delights in blood offerings, for we learn that, even so recently as on the 22nd of February, 1838, the Paunees sacrificed a Sioux girl, of about fourteen years of age, to this *compassionate* spirit. After having been tortured with fire, the girl was killed with arrows; her flesh was cut from the bones in small pieces, these pieces were carried into the field where the maize was being planted, and the blood was squeezed out upon each corn-hill. Schoolcraft, 'Personal Memoirs,' p. 614. 'Archives of Aboriginal Knowledge,' vol. iv., pp. 50, 51, vol. v., plate vi., p. 78. The ancient Mexicans were wont to conciliate the favour of Centeotl, the daughter of heaven and goddess of corn, by nailing a young man or maiden to a cross, and, after a while, the poor victim was despatched by arrows, as in the case of the Sioux girl already mentioned. In reference to this use of the cross, a writer in the *Edinburgh Review* remarks that, in both North and South America, the emblem of the cross was the common symbol of the goddess of rain; and that the sacrifice was made in the spring-time of the year, when fertilising showers were needed to promote vegetation and insure an abundant return to the husbandman. See 'The Prechristian Cross,' 'Edin. Review,' January, 1870, p. 233.

† Morgan, 'League of the Iroquois,' Rochester, 1851, pp. 161, 162.

‡ Ibid., pp. 198, 199.

§ 'Documentary Hist. New York,' vol. i., p. 238.

‖ The Gulf of the St. Lawrence is the most northern latitude to which the Indians have carried the maize plant; but there appears to be no evidence that it was cultivated, at an early date, on or near its shores. Cartier, in his voyages in 1534 and 1535, found none.—Schoolcraft, 'Archives,' vol. ii., p. 30.

of their fixed means of subsistence."* The Virginia tribes literally sustained the colony planted at Jamestown with supplies of Indian corn from their own fields, and one of the prominent services which Captain John Smith mentioned in his letter to Queen Anne, in recounting the friendliness of Pocahontas, was her leading these "conductas" of grain herself to the suffering colonists, without which they must have perished.†

The Delawares had extensive maize fields at the time of the discovery of America. In 1527, De Vaca found maize in limited quantities in Florida. De Soto, who struck more deeply into the country in his march, twelve years later, found it in abundance among the ancestors of the present Muskogees, Choktaws, Chickasaws, and Cherokees. On one occasion his army marched through fields of maize for a distance of two leagues. It appears that De Soto's army would have starved but for the supplies of maize obtained from the Indians; and among other facts it is mentioned that one of De Soto's officers found in a single house five hundred measures of maize ground to meal, besides a large quantity in grain.‡ But the southern tribes met by De Soto and his followers, in the sixteenth century, were the most advanced among the aborigines of North America. No longer in the pure hunter state, but attached to the soil, and living in large villages, consisting of dwellings more commodious than those of the ruder tribes, they were far more civilised, and paid more attention to the comforts of life than the Prairie Indians.

In 1702, when Bienville was put to straits in sustaining the infant colony of Louisiana, maize was so abundant among the Choktaws, who were the original occupants of the country, that the governor quartered the soldiers for months on that tribe.§

The Zuñis of New Mexico annually raise such an abundance of maize, that not only is there a sufficient quantity to supply their own wants, but they are enabled to export some to the west, as far as Fort Defiance, beyond the Rio Puerco.‖

* Schoolcraft, 'Archives,' vol. i., p. 6.

† Ibid., vol. ii., p. 29.

‡ Garcilasso de la Vega, 'Conquête de la Floride,' Leyden, 1731, vol. i., p. 250.

§ Schoolcraft, 'Archives,' vol. ii., p. 29. Gayarre's 'Louisiana.'

‖ Abbé Em. Domenech, 'Seven Years' Residence in the Deserts of North America,' vol. i., p. 213.

We learn incidentally from Lewis and Clarke that the Mandans raised more than sufficient maize for their own actual wants, for we are told that these Indians were particularly anxious to obtain sheet iron, out of which to form arrow-heads, and implements for scraping hides, and "when the blacksmith cut up an old cambouse of that metal (iron), we obtained for every piece of four inches square seven or eight gallons of corn," and, it is added, the Mandans were delighted at the exchange.*

The agricultural tribes of North America appear to be capable of subdivision into two distinct classes; those who derived their means of subsistence exclusively, or almost exclusively, from cultivation; and those who had only a more or less extensive partial agriculture.

North of the tropics, the only tract of country belonging to the first class was that which includes New Mexico and a portion of the basin of the great Colorado of the West.

The practice of agriculture had partially extended itself along the banks of the rivers that empty themselves into the Gulf of California from the northern boundary of the semi-civilised nations of Mexico to Culiacan, and thence to the ridge which divides those rivers from the Rio Gila. With this exception, and that already stated of the basin of the Colorado of the West, there was no cultivation west of the Rocky Mountains.

The limits of a more or less extensive agriculture were generally, and with few exceptions, as follows:—

Eastwardly, the Kinnebec, or at most the Penobscot River.

Northwardly, the River St. Lawrence and the great lakes. But the Iroquois nations in some instances extended the cultivation north of these; and there was none in a portion of the country, south of the St. Lawrence, occupied by Algonkin tribes.

Westwardly, it is desirable to distinguish between the countries east or west of the Mississippi.

East of the Mississippi, within the eastern and northern limits above stated, and with the exception of the northern portion of Wisconsin, all the Indian tribes were more or less agriculturists. Among these, the southern Indians, the Iroquois tribes, and some portion at least of those of New England held the first rank. It seems probable that, as game had almost entirely disappeared in the Choktaw country, that nation must have

* Lewis and Clarke, *l.c.*, p. 117.

depended on cultivation in a greater degree than any other. But, for their food, all the Indians east of the Mississippi, principally towards the north, depended chiefly on the chase, and they may be considered as still in the hunter state when first encountered by Europeans.

West of the Mississippi there was little or no agriculture north of the forty-first degree of latitude, or west of longitude ninety-seven degrees west of Greenwich. The Sacs (Saukes) and Foxes, the greatest cultivators in that quarter, were an Algonkin tribe, and had but lately moved beyond the Mississippi. Next to these, the Osages and other southern Sioux were the chief agricultural tribes. It was said of the Paunees that they raised no more maize than was necessary to whiten their broth.

Some stationary agricultural villages existed much farther north, in latitude forty-six degrees and forty-seven degrees, on the banks of the Missouri, belonging to the Ricarees who are a branch of the Paunees, and to the Mandans, and stationary Minetares who belong to the family of the Upsarokas. Most of the Indians of the Red River, of the Mississippi, or inhabiting the country drained by the rivers which empty themselves into the Gulf of Mexico from the Mississippi to the Rio Nueces, excepting those along the sea-shore, had a partial agriculture.

As maize was certainly a native of the country between the tropics, it follows that all the agriculture of the northern parts of the continent originated in the south, and was thence transferred northwardly. It can scarcely be doubted that it was imported *directly* into New Mexico and the countries west of it. Whether it was introduced in the same manner into the country east of the Mississippi, or lying on the banks of its western tributaries; or whether it was transferred *first* to the West Indies, and thence again to the mainland, is a debateable and perhaps insoluble question.

It may be said, generally, that agriculture prevailed more or less, limited only by climate, in all the forest country east of the Mississippi, and disappeared in the prairies destitute of timber.

That, with the exceptions which have been stated, there was no cultivation west of the Rocky Mountains; none whatever along the Pacific, from the utmost north to the southern extremity of California.

We may recognise three great divisions, in reference to the

natural means of subsistence (other than fish) of the North American Indian tribes:—The deer-hunters of the forest, the buffalo-hunters of the prairies, and the root-diggers of the west.*

There are two leading facts connected with the origination of the practice of agriculture in America which are of great importance.

The first is, that the cereals of the Old World appear to have been unknown to the American tribes. The second, that maize, which was the great and almost sole foundation of American agriculture, is exclusively of American origin, and was not known in the Old World until after the discovery of America at the end of the fifteenth century.

If these two facts be admitted, it seems not unlikely that the practice of agriculture—that first, difficult, and indispensably necessary preliminary step before any great advance can be made towards civilisation—originated in America itself; that it was not introduced from abroad; and that it was the result of the natural progress from barbarism to a more refined social state by the race of red men, insulated, left to themselves, and without aid or communication from any foreign country.

Probably nothing short of positive compulsion would be needed to effect a total change in the habits of any savage tribe living in the hunter state. "Had the Iroquois, at the time of their ascendancy, instead of exterminating the neighbouring tribes, reduced them to a state of slavery, or at least preserved and educated the children for that purpose, an inferior labouring caste would have been created. Something analogous took place among the Cherokees, whose great progress in agriculture was undoubtedly promoted by the labour of the negro slaves, captured in their wars against the whites."†

The Floridians employed, at De Soto's time, prisoners of war for working in the fields, and, in order to prevent their escape, they partly maimed them by cutting the tendons of the leg above the heel or the instep.‡ It appears, however, that among most semi-agricultural tribes of North America field-

* See Gallatin, 'Indian Means of Subsistence,' in 'Trans. Amer. Ethnol. Soc.,' vol. ii., intro., pp. xlvi.—lii. Gallatin, 'Archæologia Americana,' vol. ii., p. 149; and Gallatin, 'Origin Amer. Civilization,' in 'Trans. Amer. Ethnol. Soc.,' vol. i., p. 199, *note.*

† Gallatin, 'Origin of American Civilization,' in 'Trans. Amer. Ethnol. Soc.,' vol. i., pp. 195—197.

‡ Garcilasso de la Vega, *l.c.*, vol. i., p. 286, 389.

labour was imposed upon the women;* whilst the men, when not engaged in hunting or war, abandoned themselves to that listless indolence, in which savages generally love to indulge.

A system of agriculture seems to have prevailed in the south-western parts of Michigan and the adjoining districts of Indiana, very far in advance of any that is known to have existed among the ancestors of the present Indian tribes. These traces of ancient field husbandry consist of what are called "garden-beds."† These occur at intervals on the level and fertile prairie-lands for about one hundred and fifty miles, ranging from the source of the Wabash and of the western branch of the Miami of the Lakes, to the valleys of the St. Joseph, the Kalamazoo, and the Grand River of Michigan. The Indians represent them to extend from the latter point up the peninsula north to the vicinity of Michillimackinac. They vary in extent, covering, generally, from twenty to one hundred acres. The preservation of their outlines is due to the growth of the prairie grass which forms a compact sod over them. Schoolcraft figures some of the "garden-beds" of the Grand River and St. Joseph Valleys of Michigan.‡ Nearly all the lines of each field are rectangular and parallel. Two varieties of the "garden-beds" exist. One consists of rows of convex beds arranged side by side; in the other variety, a level pathway divides the convex beds from each other.§

The present races of North American Indians grow maize upon hillocks, not in rows or beds, and there are abundant indications that the system of hillock-cultivation existed generally, even at a comparatively remote period. The *ancient* corn-hills are usually three or four times the size of the modern corn-

* During the night, at certain periods, the Indian female, divested of her clothing, makes the circuit of the maize-field, in order to cast a protective charm over the crop, and thus to secure it from blight, and the attacks of vermin. Schoolcraft, 'Archives,' &c., vol. v., p. 70, plate iv. As the maize ripens, stages are sometimes erected near the field, upon which the women and children station themselves, and by noises drive away the birds; *l.c.*, vol. iii., p. 63, plate v.

† See page 220.

‡ 'Archives of Aboriginal Knowledge,' vol. i., plates vi. and vii., p. 58.

§ This mode of growing maize appears to resemble that recommended by Cobbett, who endeavoured to promote the cultivation of a variety of this plant in England. Cobbett mentions "two ways of placing, or ranging, the plants upon the ground; one, in *rows*, and the other, in *hills*. . . . . In the case of the Dwarf Corn, or 'Cobbett's Corn,' I prefer *rows*." He

hills. This arose from the want of a plough; the same hillock was cultitivated with the rude native implements several years in succession. Mr. Lapham alludes to the small hillocks, known as "Indian corn-hills," which are scattered over the surface of the country, and he adds, that these hillocks were formed in the manner indicated by their name is inferred from the present custom of the Indians. The corn is planted in the same spot each successive year, and the soil is gradually brought up to the size of a little hill by the annual additions. This is the work of the women. Some of these "Indian corn-hills" exist near the banks of the Milwaukee River, Wisconsin.*

Much of the ground about Waukesha was, in 1836, covered with "Indian corn-hills," or remains of recent Indian cultivation of maize.†

Near Rock river, Mr. Lapham noticed numerous "corn-hills" and "caches" of the present Indians, who still make their annual visits to the spot. "We saw a flattish boulder, which had been used as a sort of anvil for pounding or pulverising corn, and, perhaps, other substances." ‡

In other passages he alludes to the "garden beds:"—"The ground near Fox river, as in numerous other places, exhibits evidence of former culture in rows or beds, very different from that of the modern Indians;"§ these beds are "low, broad, parallel ridges, as if corn had been planted in drills. They average four feet in width, twenty-five of them having been counted in the space of a hundred feet, and the depth of the walk between them is from six to eight inches. These appearances, which are here denominated 'ancient garden-beds,' indicate an earlier and more perfect system of cultivation than

adds, that the rows should be five feet from each other. 'A Treatise on Cobbett's Corn,' London, 1828, chap. v., § 54—58. Mr. Stokes informs me that his father grew a certain quantity of "Cobbett's Corn" for several seasons in his garden at Fisherton, near Salisbury, planting it in *rows*. His success was so great that, about 1834, he planted an entire field, of from three to four acres, by the side of the Wilton road, with maize; but the urchins of the period, attracted by the novel appearance of the crop, committed such devastation, that the experiment was limited to a single season. I am indebted to Mr. Stokes for the loan of Cobbett's work upon the cultivation of maize.—E. T. S.

* 'Antiquities of Wisconsin,' 'Smithsonian Contributions to Knowledge,' 1855, p. 19.

† Ibid., p. 27.

‡ Ibid., p. 54.

§ Ibid., p. 61.

that which now prevails, for the present Indians do not appear to possess the ideas of taste and order necessary to enable them to arrange objects in consecutive rows.

"But, however ancient these 'garden-beds' may be, they were not made until *long after* the erection of the earth-works, for they extend across them, in some instances, as they do over the adjoining grounds. Hence, it is evident that this cultivation did not take place until after the mounds had lost their sacred character in the eyes of the occupants of the soil, for it can hardly be supposed that works executed with so much care would thus be desecrated by their builders."*

Some of the rows in the "garden-beds" are as much as six feet in width, and the "walks" no more than fifteen inches in breadth, the length being about one hundred feet."†

It appears that in Mexico the "corn-hill" mode of cultivation is still practised. Mr. Tylor says that single grains of maize are planted about three feet apart, the furrows being also three feet from each other, so that each stalk occupies about nine square feet of ground. When the plants are growing up, they dig between them, and heap up round each stalk a little mound of earth.‡

Schoolcraft inclines to the opinion that there may have been some connection between the "garden-beds" and the "animal mounds" already described,§ which occur on the opposite side of Lake Michigan. The Ottawas attribute the formation of the "garden beds" to the Mushcodainsug, or Little Prairie Indians; but Schoolcraft does not attach much importance to this statement.‖

The eastern extremity of Doty's island has long been occupied by Indians; and "corn-hills" occur over nearly its whole extent, as well as certain heaps of stones, first noticed by Mr. Lapham, who says of them:—"The ground was originally covered with loose stones, fragments of the solid limestone rock that exists everywhere not far beneath the surface. These stones have been carefully collected into little heaps and ridges, to make room for the culture of the native crops. The stone

* 'Antiquities of Wisconsin,' p. 19. See ante, page 220.

† Ibid., p. 57.

‡ 'Anahuac,' p. 172.

§ See page 344.

‖ 'Archives of Aboriginal Knowledge,' vol. i., pp. 58—64. See also Abbé Em. Domenech, 'Seven Years' Residence in the Deserts of N. America,' vol. i., pp. 391, 392.

heaps are six or eight feet in diameter, and from one to two feet in height."* It appears to be impossible to decide what particular tribe formed these stone-heaps, for the district has been occupied in succession by several different tribes. The Kikapoo Indians are the first known to have inhabited this region. The Mascoutins (*Gens des Prairies*) are stated also to have occupied it.† The Kikapoos were driven away by the Sauks and Foxes; and they, in their turn, were compelled to move farther west by the Chippewas, aided by the French, about the year 1706. In 1766, Carver found on Doty's island "a great town of the Winnebagoes,"‡ and more recently this region has been occupied by the Menominies.§

Maize is not the only grain used for food by the North American tribes. In the shallow waters of the rivers and lakes, extending north of latitude 40 deg., the wild rice (*Zizania palustris*), sometimes called "Canada Rice," is found in sufficient quantities to furnish one of the principal means of Indian subsistence. It is obtained in the shallow lakes and streams of Michigan, Wisconsin, Iowa, Minnesota, and in the valleys of the Upper Mississippi and Missouri. The grain ripens in September, and the labour of gathering it devolves upon the women, two or three of whom seat themselves in a canoe, thrust it into the field of rice, and bending the stalks in handfuls over the sides of the canoe, beat out the grain with the paddles. The rice is boiled to the consistence of hominy, and is eaten with a spoon. Sometimes it is roasted and eaten dry.‖

Schoolcraft mentions that he saw some artificial holes in the ground near his encampment, at Monominekaning (Rice Lake), which were used in treading out wild rice. A skin was put into the hole, which was filled with ears, and a man then trod out the grain. This was the only operation performed by the men. The women gathered, dried, and winnowed the rice.¶

Famine, principally among the more northern tribes, often compels the Indians to eke out a subsistence by the use of certain species of nutritious moss, and the inner bark of some

* 'Antiquities of Wisconsin,' p. 61.

† Drake, 'Life of Black Hawk,' p. 16.

‡ 'Carver's Travels,' &c., New York, ed. 1838, p. 41.

§ 'Antiquities of Wisconsin,' p. 62.

‖ Schoolcraft, 'Archives,' &c., vol. iii., pp. 62, 63, plate iv.

¶ 'Personal Memoirs,' p. 385.

trees. Major Sands mentions that the Indians who live on the Salmon-Trout River, within, but near, the western boundary of the California desert, partly subsist on a species of grasshopper or locust. These insects are dried, pounded, and mixed with grass seeds. The whole is then ground into flour, and when baked into a cake is said to make a very palatable food. These insects are to be seen in immense numbers even in the heart of the desert. They are much larger than the ordinary American grasshopper, and have very small wings.*

The Indians of California crush grass seeds and acorns into meal for their mush† and bread, by pounding the substances in a mortar made of stone or hard wood, with a stone pestle weighing three or four pounds. "To bake their bread they first smooth a place on the sand, throwing up a circular embankment, into which they pour a paste of meal and water; the sand absorbing the moisture leaves a cake; over this, grass is laid, and a fire is kindled upon it. By this process the cake is rather steamed than baked, and never has a hard crust." "Grasshoppers and crickets also form articles of food. These they procure in great quantities by setting fire to the prairies; as, for instance, a dozen

* Gallatin, 'Indian Means of Subsistence,' in 'Trans. Amer. Ethnol. Soc.,' vol. ii., intro. li. See also Abbé Em. Domenech, 'Seven Years' Residence in the Deserts of N. America,' vol. ii., pp. 312, 313. "In the neighbourhood of Sandy Lake the Indians eat a kind of potatoe, called *waul-essee-pin*, which grows in damp and clayey soil. They also eat the root known as *wau-top-pin-ee*. The bark of the *bois retord* is also boiled and eaten. The Dahcotas and several other tribes who inhabit the eastern slopes of the Rocky Mountains consume large quantities of the root of the *Psoralea esculenta*. The principal other roots used as food by the Indians are the *Anethum graveolens*, the *Cirsium virginianum*, the *Camassia esculenta*, the roots of the water-arrow (*Sagittaria sp.*), and the roots of the lily of the valley (*Convallaria sp.*), called by the Indians swan-potatoe."—Abbé Em. Domenech, *l.c.*, vol. ii., p. 311. The Snake Indians eat ants. These insects are collected by the squaws, who place them upon a flat stone, and with a rolling-pin crush them into a dense mass, rolling them out like pastry. Of this substance a soup is prepared.—Long's 'Expedition,' vol. i., p. 214.

† *Mush*, quaintly remarks Cobbett, "is not a word to squall out over a pianoforte; but it is a very good word, and a real English word, though Johnson has left it, as he has many other good words, out of his Dictionary. It means this: you put some water or milk into a pot, and bring it to boil, you then let the flour or meal out of one hand gently into the milk or water, keeping stirring with the other, until you have got it into a pretty stiff state, after which, you let it stand ten minutes, or less, and then put it into a dish or bowl. Here is a good substitute for bread. It is not, like the miserable potatoe," &c., &c. 'A Treatise on Cobbett's Corn,' chap. ix., § 156.

or more persons will form a circle, set the grass on fire, moving at the same time towards the centre, and driving these insects into the flames; by which means their legs are burnt off. They are then collected, and pounded with deer tallow and used for food." *

The Ricarees make bread both of corn and beans; the latter they take from the mice of the prairies, who discover and collect them. †

The Senecas use three varieties of maize—the White (*O-na-o'-ga-ant*), the Red (*Tic'-ne*), and the White Flint (*Ha-go'-wä*). Maize is, and for a long period appears to have been, their staple article of food. When it is ready to be harvested, they pick the ears, strip down the husks, and braid them together in bunches, with about twenty ears in each. These bunches are then hung up ready for use. The White Flint ripens first, and is the favourite grain for *hommony;* ‡ the Red ripens next, and is used principally for charring and drying. The White ripens last; it is the corn most esteemed by the Indians, and is used for bread. They shell their maize by hand, and pound it into flour in wooden mortars (*Gä-ne'-ga-tä*), about two feet in diameter, made from the trunks of trees. In doing this they use a wooden pestle, § about four feet in length, grasping it at a narrow part in the middle. In two hours from the time the maize is taken from the ear it is ready to be eaten, in the form of unleavened bread. Maize is hulled by being boiled in ashes and water, after which it is thoroughly washed and pounded into meal. The loaves or cakes made of it are about an inch in thickness, and six inches in diameter; they are cooked by being boiled in water.

The practice of charring maize is of great antiquity among

* E. M. Kern, quoted in Schoolcraft, 'Archives,' &c., vol. v., p. 649.

† Lewis and Clarke, *l.c.*, p. 76. This is not a solitary instance of the practice of plundering the stores of food laid up by these thrifty little creatures, for we learn from the same book, that when the travellers "stopped for dinner, the squaw went out, and after penetrating with a sharp stick the holes of the mice near some drift-wood, brought to us a quantity of wild artichokes, which the mice collect and hoard in large numbers."—Lewis and Clarke, *l.c.*, p. 133.

‡ "*Hominy* is Indian corn soaked, husked, and then boiled in water over a gentle fire. The thin of this is what my Lord Bacon calls 'cream of maize.'" —Beverley, 'Virginia,' Book iii., 1725.

§ An interesting notice of pestles and mortars, by Mr. Syer Cuming, is published in the 'Journal of the Archæological Association,' vol. vii., pp. 83—90.

the red race,* and in this state it can be preserved for years. For this purpose the Red maize is preferred. The ears are picked when green, and are roasted in the field before a fire, being set up on end in a row.† The ears are not actually charred, but only roasted sufficiently to dry the grain. In this state maize is much used by hunting parties, its bulk and weight having been diminished about one-half. The charred maize was frequently parched a second time, and mixed with about a third part of maple sugar. This formed the sole food-supply of some of the hunters, when on their expeditions, for days together,‡ and was known as *rockeage* or *yokeage*.§

Schoolcraft mentions that this preparation of maize was used by the warriors when they expected to be absent for several days. "The grain was reduced to a finer condition than *samp*.‖ It

* "The Indians live chiefly on maize, roasted in the ashes, sometimes beaten and boyled with water, called *homine*."—Thomas, 'Pennsylvania,' London, 1698, p. 49, quoted in Bartlett's 'Dict. of Americanisms,' p. 200. Roger Williams, in his 'Key to the Indian Language,' has the word *aupúminea*, "parched corn," which, with the accent on the second syllable, has much the sound of *hominy*.—Bartlett, 'Dict. of Americanisms,' p. 199.

† Cobbett tells us that :—"Roasted ears are certainly the greatest delicacy that ever came in contact with the palate of man. . . . . The grains are so many little bags of roasted milk, the sweetest that can be imagined; or, rather, are of the most delightful taste. . . . . You take the tail of the ear in one hand, and the point of the ear in the other hand, and bite the grains off the cobb. I need scarcely say that this must be done with the front teeth, and that those who have none must be content to live without 'green ears.'" 'Treatise on Cobbett's Corn,' chap. ix., § 154.

‡ 'League of the Iroquois,' pp. 370—373.

§ Bartlett, 'Dict. of Americanisms,' p. 369.

‖ Samp (Abenaki Ind., seaump, nasaump). Roger Williams describes *nasaump* as a "kind of meale pottage unparched; from this the English call their *samp*, which is Indian corn, beaten and boiled, and eaten hot or cold with milke or butter, which are mercies beyond the natives' plaine water, and which is a dish exceedingly wholesome for the English bodies."—'Key to the Indian Language,' p. 33, quoted in Bartlett's 'Dict. of Americanisms,' p. 378. "Blue corn is light of digestion, and the English make a kind of loblolly of it to eat with milk, which they call *sampe*. They beat it in a mortar, and sifte the flower out of it."—Josselyn, 'New England Rarities,' 1672. "It is ordered that the treasurer doe forthwith provide tenn barrells of cranburys, two hogsheads of speciall good *sampe*, and three thousand of codfish, to be presented to his majesty, as a present from this Court."—'Massachusetts Col. Records,' 1677, vol. v., p. 156, quoted in Bartlett's 'Dict. of Americanisms,' p. 379. According to Cobbett, the maize used for making *samp* must be "thumped as we do oats, to get the skin off it." 'A Treatise on Cobbett's Corn,' chap. ix., § 158. Cobbett enumerates the following names by which preparations of maize for food are known :—*Mush*, *homany*, *samp*, and *suppawn*; *l.c.*,

was then mixed with sugar, made from the *Acer saccharinum.* This was packed in a leather bag, and was carried on the person. When eaten it was moistened with water. The piola of the Mexicans is a similar preparation. A gill of it per day is said to be sufficient to keep life in a man.*

We are told also that:—"The Indians delight much to feed on roasting ears (of maize), gathered green and milky, before it is grown to its full bigness, and roasted before the fire in the ear. And, indeed, this is a very sweet and pleasing food."†

According to another writer, the Indians make bread from maize precisely in the same way as the Mexican "rancheros." They boil the grains, crush them on stones until they form a paste, which is then baked on hot ashes. The *pomme blanche*, called also *gamache* by the trappers, is sometimes used instead of maize; it is a root in shape like an onion, and has very little flavour.‡

The Omahas bruise the hard ripe maize between two stones, one or two grains at a time, the larger stone being placed on a skin, that the flying fragments may not be lost. This coarse meal is boiled into a mush, called *Wa-ne-de.* It is sometimes parched before being pounded, and the mush prepared from this description of meal is known as *Wa-jun-ga.*§

The mode of pounding dry maize by the grain-raising tribes, however, varied considerably. It was a species of work left wholly to the women.‖ Mortars and pestles of stone were usually employed. The mortar was sometimes a depression in the face of a rock, or in a detached block of stone. Mr. Bartlett counted twenty-six such artificial cavities at El Paso, within a few feet of each other; they were each from twelve to eighteen inches in depth, and about six in diameter. These had been

ch. ix., § 153. "*Suppawn* is neither more nor less than porridge; that is to say, boiling milk, broth, or water, thickened with corn-flour;" *l.c.*, chap. lx., § 155.

* Schoolcraft, 'Archives,' &c., vol. i., p. 84.

† Beverley, 'Virginia,' 1705, Book iii.

‡ Abbé Em. Domenech, 'Seven Years' Residence in the Deserts of N. America,' vol. ii., p. 313.

§ 'Long's Expedition,' *l.c.*, vol. 1, p. 213.

‖ The Hon. J. R. Bartlett writes thus of the Pimo Indians:—"Grinding corn on the metatls, or stones, is a work of great labour, and comes hard on the poor women, who are obliged to get upon their knees, and exert the whole strength of their arms and bodies in the task."—'Explorations in Texas,' New York, 1854, vol. ii., pp. 223, 224.

hollowed out by the Indians, and served as mortars in which to pound their maize.*

Hunter informs us, that in some of the Indian villages visited by him, there were one or two large stone mortars for pounding corn, which were public property. These were placed in a central part of the village, and were used in rotation by the different families.†

Frequently a block of wood, hollowed with the aid of fire, served as the mortar. The Paunee women pound maize with a heavy club in a mortar formed of the hollowed trunk of a walnut tree.‡ The pestle consisted usually of a piece of wood, about four feet in length, rounded at each end, and having a narrow part in the middle, by which it was grasped. This kind of pestle and mortar has been figured.§ Stone corn-crushers of various other forms have also been figured by Schoolcraft.‖ The Pennacooks of the Merrimack Valley, New Hampshire, were accustomed to suspend a stone pestle from the limb of a tree, which acted as a spring, and saved the squaw labour in lifting the pestle. These pestles were usually ornamented with a human head, or the head of a deer, or some other animal, sculptured at one end. Engravings of three such pestles, and the figure of a woman using one, are given by Schoolcraft.¶

Stone Hatchets.

A 43.

Nos. 1 to 19** are wedge-shaped stone hatchets, all found in Ohio.

No. 1 is much blunted at the edge. Nos. 2 and 14 are flat on

* Bartlett, 'Explorations,' &c., vol. ii., p. 370.

† John D. Hunter, 'Manners and Customs of Indian Tribes,' &c., pp. 269, 270.

‡ Murray, 'Travels in N. America,' vol. i., p. 314. Schoolcraft, 'Archives of Aboriginal Knowledge,' vol. iii., pp. 466, 467.

§ Schoolcraft, *l.c.*, vol. iii., p. 228, plate xxviii., fig. C.

‖ 'Archives of Aboriginal Knowledge,' vol. iii., plate xxxiii.; vol. v., p. 649, figs. 1 and 2; vol. ii., p. 90, plate xlvi., fig. 5; vol. i., p. 92, plate 27, fig. 8.

¶ Ibid., vol. iv., p. 175, plate xxi., figs. 1—4.

** The following hatchets are of greenstone:—Nos. 1 (370), 4 (368), 5 (367), 6 (389), 8 (379), 11 (403), 15 (385), 16 (376), and 19 (386). The following are of felspathic greenstone:—Nos. 7 (388), 9 (381), 10 (391), 12 (402), 13 (415), 17 (398), and 18 (397). The following are of felstone:—Nos. 2 (410), 3 (389), and 14 (409).

the under surface. Nos. 5 and 6 appear to have been bruised at the butt end, perhaps from blows given with a hammer-stone. No. 13 is thin, and has straight sides; it was probably used as an adze-blade.

The wedge-shaped stone hatchets met with in America present a considerable general resemblance to those found in Europe. Stone gouges are comparatively abundant in America; there are no less than thirty-seven specimens in the Collection of the American Antiquarian Society.* Stone hatchets and axes were not usually employed like the modern iron axes, for cutting down timber; this was chiefly effected by means of fire.

No. 20 (S and D 417) is a thin plate of mica slate, in the form of a "gorget,"† measuring five inches in length, one inch and seven-eighths in breadth, and about three-eighths of an inch in thickness. It was classed by Dr. Davis with the stone chisels, but it has not a cutting edge. No. 21 (S and D 407) is a rather thicker and less finished example than No. 20. It is of greenstone, and measures three inches and a quarter in length, one inch and five-eighths in width, and about seven-eighths of an inch in thickness. It is not easy to determine the intended use of these two objects (Nos. 20 and 21). Perhaps, however, they were used in preparing skins. Schoolcraft classes similar tools as "fleshing instruments." He says:—"It is a species of hand-chisel, blunt that it may not cut the skin, and yet of sufficient edge and hardness to permit a stout jerking blow. It was grasped firmly by the top. It was often very rude, and, indeed, was no more than an elongated stone, small, and brought to a blunt edge." This implement was used for removing the adhering flesh, &c., prior to currying the skins of animals killed in the chase.‡

Skin-Scrapers and Methods of Dressing Skins.

In the Old World, flint skin-scrapers, in form like the specimen from Les Eyzies, Dordogne, Fig. 114, appear to have been the implements in general use for dressing skins. In some of

* 'Proceedings Amer. Antiquarian Soc.,' No. 49, April 29, 1868, pp. 48—50.

† See pages 476—479.

‡ Schoolcraft gives figures of such implements, 'Archives,' &c., vol. i., p. 94, plate xxix., figs. 5 and 6; p. 81, plate ii., fig. 4.

the bone caves they are very abundant; many examples may be seen in Cases B 12 to 14. That these implements really were used for the purpose suggested, appears to be proved by the circumstance that flint scrapers, precisely like the ancient examples, are still employed by the Esquimaux. No. 2, Case E 2, is one of these modern tools, the flint blade of which is represented, of the natural size, by Fig. 115. The ancient flint

FIG. 114. Nat. size.

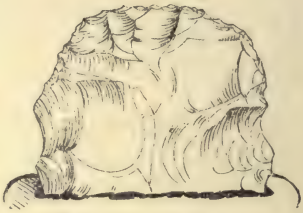

FIG. 115. Nat. size.

scraper, from Les Eyzies, Fig. 114, is also represented of the natural size. It will be seen that in form these two specimens are almost identical; the one was used by men contemporary with the mammoth, the other yesterday. The handles of the ancient specimens have perished; but we may suppose that they resembled those of the modern scrapers. The Esquimaux scraper in the Collection is mounted in wood, grooved to receive the thumb and two first fingers of the right hand, as shown by Figs. 116 to 118. The third and fourth fingers were doubled beneath the tool, in a groove made for the purpose. This implement had a planing action, and was pushed forward by the palm of the hand.

FIG. 116.

FIG. 117.

FIG. 118.

The visitor will probably expect to see similar implements in

the American series, particularly as the preparation of skins forms an important item in the daily occupation of the hunter tribes. In North America, however, a bone implement resembling a chisel, and a stone implement not unlike the ordinary stone hatchet, but having a blunted edge, appear to be the tools usually employed. Scrapers of European types are, nevertheless, found in North America. A scraper of chalcedony, of the type of Fig. 114, found at Walla Walla, on the Columbia River, is exhibited in the Museum of Practical Geology, Jermyn Street, London; and scrapers of obsidian, of similar form, are found in Mexico; there is an example in the British Museum, and four very fine specimens are preserved in the Christy Collection. Scrapers were employed to work and soften skins, and to remove the flesh and fat adhering to them; for the hunter is usually in haste when he removes the skin from the animal he has killed, and prefers infringing upon the carcase to endangering the value of the hide. The task of dressing the skins devolves upon the women.* Brain is used in preparing the hide, the quantity obtained from one animal being sufficient to dress its skin, although sometimes only about two-thirds of the entire quantity is employed for the purpose.† The vertebræ are broken up by means of stone axes, "similar to those which are not unfrequently ploughed up out of the earth in the Atlantic States;" the fragments are then boiled, and the rich fat which rises is carefully skimmed off, and put up in bladders for future use.‡ It has been stated that the Paunees usually cut up a buffalo and pack the whole of its flesh upon a horse in less than fifteen minutes, not leaving meat enough upon the ground even to feed a dog. All this is done with an ordinary knife only; no saw, axe, or cleaver is used, and yet brain, marrow, heart, and liver are taken.§ In order to extract the brain, the fore-leg of the animal is cut off at the knee-joint, and the shank being grasped as a handle, repeated blows are struck with the hoof upon the frontal bone until it is broken through.‖ In cutting up the animal, the carcase is placed upon its knees, and the hind legs are stretched out to their full length, so that

* Schoolcraft, 'Archives of Aboriginal Knowledge,' vol. i, p. 91. Figs. 6, 7, 8, plate lxxvi., vol. ii., are adzes used for scraping skins.

† Long, 'Expedition to the Rocky Mountains,' Philadelphia, 1823, vol. i., p. 211, 221.

‡ Ibid., vol. i., p. 211.

§ Murray, 'Travels in N. America,' vol. i., pp. 297, 298.

‖ Ibid., vol. i., p. 298, *note.*

the entire weight is thrown upon the belly. The small hump is first taken out. This is a mass of flesh about the neck, weighing almost three pounds, and is attached to the large hump. The skin is then removed, after which the carcase is cut up.*

Skins obtained from the buffalo during the summer are chiefly used in the construction of lodges, for laryettes, thongs, or wrappers for bales. Robes are prepared from the skins of buffalo killed during the autumn and winter; the best are those taken from animals killed in October, as the hair is then young, fine, and soft.† The Hon. H. H. Sibley mentions that the best skins for robes are obtained during the months of November, December, and January. The skins converted into robes are principally those of the cows; those of the bulls are too

* The technical terms used for the different parts into which the carcase is divided are—

1. *Les depouilles*—taken from each side of the animal, from the shoulder to the haunches.
2. *Les filets*—the great muscles, which connect the shoulder-blades and the haunches.
3. *Les bricoles*—two strips of fat, which run from the shoulder to below the neck.
4. *Les petits filets du cou*—small muscles, which spring from a point near the end of the gros filets.
5. *Le dessus de croupe*—which begins above the flanks.
6. *Les deux épaules.*
7. *Les dessous d'epaule*—strips of flesh between the sides of the breast-bone and the shoulders.
8. *Le pis*—the flat part surrounding and containing the udder.
9. *Le ventre.*
10. *La panse*—the tripe.
11. *La grosse bosse*—the large hump.
12. *Le gras*—the tallow inside the animal.
13. *Les plates côtes*—the ribs.
14. *La croupe*—the rump.
15. *Le brochet*—the breast-bone.
16. *La langue.*

If the hunter becomes thirsty, and is unable to obtain water, he chews the cartilaginous part of the nostril of the dead buffalo. If he is hungry he devours the kidneys, which he cooks after a fashion, by immersing them in the gall-bladder, or he eats them raw.—Schoolcraft, *l.c.*, vol. iv., pp. 105, 106. The meat of the buffalo-cow is infinitely preferable to that of the male buffalo; but that of the bull, particularly if killed in the mountains, is in better condition during the winter months. From the end of June to September bull-meat is rank and tough, and almost uneatable, while the cows are in perfection, and as fat as stall-fed oxen.—Ruxton, 'Adventures in Mexico,' p. 266.

† Murray, *l.c.*, vol. i., p. 338.

thick and heavy to be easily reduced by the ordinary process of scraping.*

Whilst in the *green* state the hides are stretched and dried as soon as possible, and, on the return of the tribe to the village, they are gradually dressed during the intervals of other occupations. The hide is extended upon the ground, and all the adherent portions of dried flesh are removed by an adze-like implement. The skin is then covered with brain or liver, and the warm broth of the meat is poured over it. It is subjected to much subsequent scraping, and, after all, should it not be sufficiently supple, it is pulled backwards and forwards over a twisted sinew.†

When it is desired to preserve the hair, the skin is extended in the shade, a thin covering of the recent dung of the buffalo mixed with clay is spread upon the fleshy side of the skin; this is kept constantly moistened with water for two or three days. The skin is then thoroughly cleansed and rubbed with brain, until it becomes soft and pliant. It is next washed in water thickened with corn bran; after this it is dried, and is finally scraped with bones, sharp stones, or knives, or sometimes it is worked soft by drawing it backwards and forwards over the rounded end of a piece of timber fixed in the ground. The final process is to smoke the skin in the smoke-aperture of the lodge, or in a place constructed for the purpose. Should the hair at any time become loose, the hairy side is covered with finely-cut oak bark, and water is sprinkled over it several times a-day. When skins are to be dressed without the hair, they are covered with ashes, and kept in a trough of water, until the action of the ley renders the removal of the hair easy. The skin is then dressed in the usual manner.‡

The Crows dress skins by immersing them, for a few days, in a ley of ashes and water, until the hair can be removed; they are then stretched upon a frame placed on the ground, where they remain for several days, with the brain of the buffalo or elk spread upon and over them. After this they are scraped by the squaws with a sharpened bone, frequently the shoulder-blade sharpened at the edge, and finally the skin is smoked.§ The

* Schoolcraft, *l.c.*, vol. iv., p. 94.

† Long, *l.c.*, vol. i., p. 221.

‡ Hunter, 'Manners and Customs of the Western Indians,' Philadelphia, 1823, pp. 295, 296.

§ Catlin, 'North American Indians,' vol. i., pp. 45, 46.

Dahcotas remove the fat from the skin, then dip it in water containing the brain of deer, after which they stretch it upon the ground in the usual manner, and scrape it with an implement of bone, horn, or iron, a fire being kept burning in order to dry it. When dry, it is dipped a second time in the brain water, and again scraped until dry. This process is repeated the third time, and if, after all this working, the skin should still continue hairy or stiff, it is drawn over a cord as large as the finger, for some time, as hard as it can be pulled, which renders it soft and pliant.* The skin is then smoked. A hole is dug in the ground, about a foot in depth, and a small fire is lighted in it. Upon this some rotten wood is placed, the skin is sewn into a bag-like form, and hung over the smoke, and in ten minutes it is ready for use.† The Paunees prepare skins by stretching them in the sun, fixing them to the ground by small wooden pegs driven through the edges. When thoroughly dry, all the hair is scraped from one side, and the scurfy, horny matter from the other, with a kind of crooked chisel, made sometimes of hard wood, but more frequently of the leg-bone of the buffalo. The skin is then dressed in the usual way, by covering it with brain and scraping it.‡

A 44.

Nos. 1 and 6 are stone hatchets found in the United States. Nos. 2 to 5, and 7 to 14, are stone hatchets found in Ohio.§ No. 7 has straight sides; Nos, 9, 10, and 14 are flat on the under side. No. 15 (S and D 408) is a flint tool of the hatchet form, from Ohio. It is quite small, being only one inch and five-eighths in length, and one inch and a quarter in breadth; it is the only implement of flint of a hatchet shape in the Squier and Davis collection. Nos. 16 to 18 (S and D 411, 413, 412) are small hatchets of hæmatite, from Ohio. No. 18 appears to be unfinished. It has been mentioned‖ that

* Skins were softened in Iceland by being pulled to and fro over a ram's horn, slung from the branch of a tree. See page 75.

† Schoolcraft, *l.c.*, vol. iv., pp. 60, 61.

‡ Murray, *l.c.*, vol. i., pp. 338, 339.

§ The following hatchets are of greenstone:—Nos. 2 (373), 5 (365), 6, 7 (384), 8 (392), 11 (387), 12 (396), and 13 (404). The following are of felspathic greenstone:—Nos. 3 (374) and 4 (369). The following are of felstone:—Nos. 9 (405) and 14 (65). No. 10 (414) is of quartzose greenstone. No. 1 is of whetslate.

‖ See page 481.

copper was treated by some of the North American tribes as a *malleable* stone. In the present and similar instances, we find that an ore of iron was rubbed down and worked by them as a mere hard variety of stone. Perhaps the use of hæmatite for paint may have led to its employment for other purposes. Nos. 19 to 22* are stone chisels from Ohio. No. 20 is a fine and nicely-finished implement; it is ten inches and a quarter in length, and one inch and three-eighths in breadth. No. 22 is four inches in length, and an inch and a quarter in breadth. No. 21 is of a totally different form to the other chisels; it is five inches in length, the cutting edge being only half an inch; the butt-end is left broad and large, apparently to adapt it for use in the hand; at this part the tool is about an inch and one-eighth in diameter. No. 23 (S and D 390) is a greenstone hatchet, from Ohio.

A 45.

No. 1 is a thin, lanceolate-shaped implement of chert. It measures about fourteen inches in length, five and a quarter in breadth, about three quarters of an inch in thickness, and is fashioned entirely by chipping. This kind of implement is thought, by Mr. Rau, to have been used for agricultural purposes.† The scapula of the bison, mounted at the end of a stick, was frequently used as a hoe by the North American tribes.‡

No. 2 is a thin ovate implement of chert, pointed at both ends, and flattened on one surface; it is slightly rubbed (artificially) towards the middle on the more convex side. It measures eight inches and a half in length, its greatest breadth is two inches and three quarters, and it is three quarters of an inch in thickness. No. 3 is a chisel of greenstone. No. 4 is a greenstone hatchet of unusual form; it is flat on the under surface, and pointed at the butt end; it measures ten inches and three quarters in length, one inch and seven-eighths in breadth,

* Nos. 20 (421) and 22 (419) are of greenstone. No. 21 (420) is of felspathic greenstone. No. 19 (418) is of felstone.

† See page 444.

‡ Long, *l.c.*, vol. i., p. 290.

and is one inch and a half in thickness. No. 5 is a hatchet of compact greenstone (aphanite); it is of the usual wedge-shaped form, and measures fourteen inches in length, three inches and a half in breadth, and two inches in thickness. No. 6 is a greenstone hatchet. No. 7 is a hatchet of felspathic greenstone.

Nos. 1 to 7 are from various parts of the United States. Nos. 8 and 9 (399, 401) are hatchets of compact greenstone (aphanite), from Virginia. Nos. 10 to 12 are stone hatchets from New Jersey.* No. 13 is unfinished. No. 14 (S and D 375) is a stone hatchet from Maryland. No. 15 (S and D 366) is a nicely-finished hatchet of felspathic greenstone, from Alabama; it measures nine inches in length. Nos. 16 and 17 (S and D 371, 372) are greenstone hatchets, from Florida. No. 18 is a hatchet-shaped implement of felspathic greenstone, from Missouri. The part usually brought to a cutting edge has, in this specimen, been *purposely* blunted, the surface being nearly half an inch in breadth. Marks of grinding are still to be seen upon this surface.† Nos. 18 and 19 were shown in the Paris Exhibition, 1867. No. 19 is a hatchet of hæmatite, from Warsaw, Illinois.

Probably, many of these wedge-shaped stone hatchets were not intended to be hafted, but were for use in the hand. Loskiel, however, says of the Delawares (p. 54):—"Their hatchets are wedges made of hard stones, six or seven inches in length, sharpened at the edge, *and attached* to a wooden handle." He adds:—"They are not used to fell trees, but only to peel them, and kill their enemies."

One way in which wedge-shaped stone hatchets were mounted may be seen from the portrait of "Black Elk," which is placed near Case A 43, and who is represented with one of these hafted implements in his hand. Other methods of mounting stone hatchets may be seen in Cases E 2 and C 40. Schoolcraft figures some hafted wedge-shaped stone hatchets, mounted at right angles to the handle, the handle measuring from twenty to

* Nos. 10 (393) and 12 (383) are of felstone. No. 13 (394) is of micaceous greenstone.

† The occurrence of *blunted* stone implements, in form like the ordinary wedge-shaped hatchets, has been noticed at page 91. In Mr. J. Wickham Flower's collection (Croydon) is an ancient Gaulish stone implement, and also one found at Aix, Provence, both of which have been blunted, *purposely*, like No. 18.

twenty-seven inches in length.* A stone implement, mounted as an adze, has also been figured by Schoolcraft.†

Among the Spokain Indians, and some of the tribes west of the Rocky Mountains, according to Mr. Lord, stone hatchets are handed down from father to son as cherished heirlooms. Jade meris‡ are similarly regarded as heirlooms by the New Zealanders, and are highly prized by them.

The use of stone hatchets does not appear to have been so general among the tribes west of the Rocky Mountains as among those who inhabited the country to the east of this range. "From a careful observation of the arts among the Aht natives," says Mr. Sproat, "I am tolerably certain that no other materials than bone and shell were required by them for making their tools and weapons up to the time when iron was brought amongst them, say, within the last 150 years. They used bone tools, and bone fishing and hunting instruments, long after they had a knowledge of iron—as lately, indeed, as a few years ago; and, at the present time, the mussel-shell adze, used in canoe-making, is preferred to one of any other material, and to the best English and American chisels. In felling large cedar-trees, and in other work, until the natives obtained the admirable American woodman's axe, they found their bone chisels more useful than any small-handled instruments of stone or iron; bone had the requisite toughness, bluntness, and penetrating power for working cedar-wood for their purposes. The Ahts, however, had a few stone and copper (the latter not melted or cast) implements, when they were first visited by Cook, and probably earlier, and ground stone chisels can be found amongst them at the present day. But I think that these stone implements could not have been in general use on the Aht coast, as the Indians never describe their utility, but produce old bone implements for every purpose on being asked what they used before they had iron."§

The Aht hunters, prior to the introduction of iron among

* 'Archives,' &c., vol. ii., plate lxxiv., figs. 7, 8.

† Ibid., vol. ii., plate lxxiv., fig. 5.

‡ The *meri* or *patiti* is a kind of small club, about a foot in length. It is made of wood, bone, or stone. There are three varieties of the *meri*: 1st, the "battledoor" shape; 2nd, the "fiddle-shaped" *meri*; 3rd, the "bill-hook" shaped *meri*. Examples of the three types are to be seen in the Collection. For a notice of *meris*, by Mr. Syer Cuming, see 'Journal Archæol. Association,' vol. x., pp. 109, 110.

§ Sproat, 'Scenes and Studies of Savage Life,' 1868, *Appendix*, pp. 316, 317.

them, used a kind of thrusting sword, having a wooden handle, three feet in length, tipped with the shell of the mussel.*

Lewis and Clarke tell us that the Indians on the Columbia split drift pine-wood with a wedge made of elk horn, driven by a mallet of stone curiously carved.†

The Rev. R. H. Codrington, Fellow of Wadham College, Oxford, now engaged in the Melanesian Mission, is most kindly collecting information and specimens for those connected with the Blackmore Museum, in the hope that, thereby, light may be thrown upon some prehistoric habits and objects. The following extract from one of his letters, written at sea, off Norfolk Island, and dated October 30, 1869, brings before us a state of things, in the island of Mota, which vividly illustrates the practices and simple arts of the Stone Age:—

"The progress of European implements in supplanting the native tools, in Mota, is amazing, and the aspect of the place is quite changed, owing to the introduction of iron, since I was there six years ago. I could obtain only one fish-hook of the old style, of a sort retained for catching flying fish; the common old tortoiseshell fish-hooks are no longer used. I could only procure two shell implements, an axe and an adze. In former times the natives used no other material than shell for their cutting tools. I was particular in making inquiries on this point. If they found a stone with a sharp edge they used it until it was blunted, and then threw it away; they also picked up pieces of obsidian, and used them for shaving; but none of these stones were sharpened by art. They ground their shell implements into shape upon convenient surfaces, on rocks, and upon detached blocks of stone. I know of one of these grindstones, which weighs about a hundredweight. In the preparation of food they used large wooden platters, and sticks for pestles. Fire was obtained by rubbing two pieces of wood together in a particular manner. They dug with sticks; and there are some old-fashioned bamboo knives, which I must obtain for the Blackmore Collection. The natives got on with wonderfully few implements, and as few arts as it is possible to conceive. They imported their bows from one place, their arrows from another, and made a good deal of their own money. Having abundance of food, they carried on their little commerce by means of it and their money."

* Sproat, *l.c.*, p. 243.

† Lewis and Clarke, *l.c.*, p. 353 (Oct. 17, 1805).

Stone Axes.

A 46.

Nos. 1 to 16* are grooved stone axes, all found in Ohio.

These axes appear to belong to two classes. The first, a mere boulder, or at most an artificially-rounded stone, with a groove worked at the sides (see Fig. 119), or around it near the middle. The other grooved axes are more carefully finished; one side

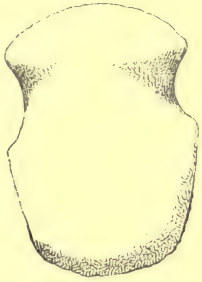

Fig. 119.

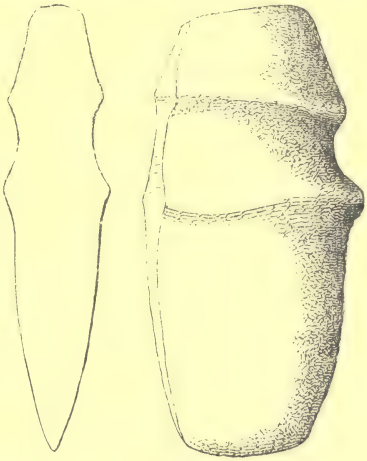

Fig. 120.

is worked to a flat surface, as shown by Fig. 120, probably that it might rest upon a corresponding flat piece of the handle; the groove is not carried round this flat side.

Fig. 121.

These two classes of axes merge into each other. The flat side is well shown in No. 12. The hammer-end of many of the grooved axes shows wear. See Nos. 7, 9, and 15. In many of the specimens the groove is bounded by a ridge on each side of it, as shown by Fig. 120; probably these ridges served to prevent the withe used in hafting from slipping. See Nos. 2, 3, 6, 9, 14. Some of the stone axes are of small size, such as Nos. 10, 11, 12. Fig. 121 represents a stone hammer found in Ireland,

* The following axes are of greenstone:—Nos. 2 (341), 3 (334), 4 (338), 5 (340), 6 (339), 7 (363), 9 (360), 10 (364), 11 (352), 12 (351), 13 (350), 14 (348), 15 (347), 16 (357). Nos. 1 (335) and 8 (355) are of felstone.

No. 17, Case A 26. This implement was probably hafted in the same way as the American stone axes, by passing a withe around the groove, and perhaps part of the handle rested against the flattened under side. This Irish hammer-stone has been very much used, as may be seen by its bruised condition.

We are told that grooved stone axes were sometimes employed as weapons in North America. "The Indians use a war club, made by bending a withe around a hard stone, of about two pounds weight, which has been previously prepared with a groove in which the withe fits, and is thereby prevented from slipping off. The handle is about fourteen inches in length, and the axe is bound to it with buffalo-hide."* Stone axes were also used for felling trees and general purposes. We learn from Adair that the Southern tribes "twisted two or three hickory slips, about two feet in length, around the grooved part of the axe, and by means of this simple and obvious invention they killed trees, by cutting through the bark, and felled them by fire when they became thoroughly dry" (p. 405).

Schoolcraft says:—"Fire was the great agent employed in felling trees. The Indians made a fire around the doomed tree; when the fire had charred the outer surface, the burnt part was removed by the women and children, who used for the purpose a stone maul, *Agakwut*. This maul had a supple withe twisted around it, at the grooved part. The withe served as a handle. The axe-head was not mounted at right angles to the handle, as only an indrawing blow was struck. Some of these axes may have been secured more firmly to their handles, by means of wedges driven beneath the flat side, and in some instances this flattened side is slightly hollowed as if for this purpose."†

A 47.

Nos. 1 to 4 are grooved stone axes, found in Ohio. Nos. 5 to 9 were found in Virginia, Nos. 10 to 13 in New Jersey, No. 14 in New York, No. 15 at Bunker's Hill, Massachusetts, No. 16 in Kentucky, and Nos. 17 and 18 in Iowa.‡

* Marcy and M'Clellan, 'Exploration of the Red River of Louisiana,' Washington, 1853, p. 98.

† 'Anc. Mon. Miss. Valley,' p. 217. Schoolcraft has figured one of these implements, hafted, 'Archives,' &c. vol. i., p. 285, plate xv.; and several, not hafted, vol. i., p. 82, plate xiv., figs. 1 and 4; p. 84, plate xvi., figs. 1, 2, 3, 4.

‡ The following axes are of greenstone:—Nos. 1 (342), 2 (345), 3 (358), 4

The flattened side of Nos. 4 and 18 is slightly concave. No. 8 is polished in the groove, probably from the slipping of the withe handle; this polishing does not extend over the flat side, showing that the withe handle was not in contact with this part of the implement. The axe-heads having a groove carried completely round them are Nos. 5, 6, 7, 9, 11, 13, 14, 15, and 17.

No. 13 is a plaster cast of a grooved stone axe found in New Jersey; the original has attracted much attention on account of the inscription which occurs on its two surfaces. The original axe was exhibited at the annual meeting of the American Ethnological Society in 1861.*

Dr. Evans mentions, in a letter dated Jan. 1, 1859, that the original axe was found near the north branch of the Rancocas Creek, Pemberton township, Burlington county, New Jersey. It was ploughed up in September, 1858, on the farm of Samuel R. Gaskill, and is said to have attracted the attention of the finder by the curious characters inscribed upon it, *the finding of the usual Indian relics being of too frequent occurrence to excite any special interest.* Mr. Gaskill is said to have deepened some of the characters in attempting to render them more distinct. The freshness of the markings consequent upon this has excited a certain mistrust of the genuine character of the inscription. Dr. Evans, however, has expressed himself as being perfectly satisfied that the characters have not been inscribed upon the axe for purposes of deception. He states that Mr. Gaskill is well known to him; that he is a man of high principle; and, moreover, that he has not sufficient knowledge of archæology to enable him to accomplish such a forgery, if it be a forgery, as that upon the Pemberton axe. Mr. Gaskill appears to have attached no particular importance to the discovery, and he at once presented the specimen to Dr. Evans when he asked for it. The original is of a grey, compact sandstone. The inscription in parts retains the brown, decomposed appearance of the general surface of the axe; only a few of the characters, by their freshness, show the recent attempt to deepen them.†

(359), 6 (362), 17 (336), and 18, found in Jefferson county, Iowa (Paris Ex., 1867). No. 12 (346) is of compact greenstone. Nos. 5 (344), 7 (425), 9 (425) are, perhaps, of basalt-wacké. No. 8 (361) is of hornblende. Nos. 10 (343), 14 (337), 15 (354), and 16 (349), are of felstone. No. 11 (356) is of gneiss. No. 13 is a plaster cast.

* 'Bulletin Amer. Ethnol. Soc.,' vol. i., pp. 44—47.

† See Wilson, 'Prehistoric Man,' vol. ii., pp. 185, 186, fig. 50.

Stone Arrow- and Spear-Heads.

B 31.

Upon Tablets 1 to 3 are flint spear-heads, found in Texas. Upon Tablet 4 is a flint arrow-head, found in Missouri. Upon Tablet 5 are three flint arrow-heads, found at Warsaw, Illinois. Upon Tablet 6 are two flint arrow-heads, found in Indiana. Upon Tablet 7 are four flint arrow-heads, found in Kentucky. Upon Tablets 8 to 10 are arrow- and spear-heads of flint and milky quartz, found in Virginia. Upon Tablet 11 is a flint arrow-head, found in Pennsylvania. Upon Tablet 12 are stone arrow-heads, found in New Jersey. Upon Tablet 13 is a stone "gorget,"* found in a shell-mound† at Rockland, Long Island. Upon Tablet 14 are two flint arrow-heads, found on the bank of the Hudson river, near West Point, New York. Upon Tablet 15 are flint flakes, found in Ohio. Upon Tablets 16 to 28 are arrow- and spear-heads of flint, milky quartz, and other varieties of stone, found in Ohio.

B 32.

Upon Tablets 1 to 24 are arrow- and spear-heads of flint, milky quartz, and other varieties of stone, found in Ohio.

Of the triangular type,‡ which, perhaps, is not so elongated as in European examples, the following specimens may be noticed:—*c* Tablet 8, *b* and *d* Tablet 12, *a* Tablet 21, all in Case B 31.

Of the leaf-shaped,§ *a* and *b* Tablet 3, Case B 31; *a* and *b* Tablet 14, and the specimens on Tablets 15 and 16, Case B 32, are the most typical examples. Some of these specimens have notches in the side, towards the base, intended, no doubt, to assist in securing them to a shaft. The arrow-heads on Tablet 8, Case B 32, are believed to have been used for shooting fish. All the other specimens belong to the stemmed and barbed type.‖ It may be noticed that the typical stemmed American

* See pages 476—479.
† See pages 193—200.
‡ See page 85.
§ See page 86.
‖ See page 85.

arrow-heads, such as those on Tablets 2, 3, 4, 11, 12, and 13, Case B 32, might almost be classed as "triangular, with notches at the sides," the base of the stem extends so much on each side. The comparative absence of leaf-shaped spear-heads in the Surface series, such as those found in the Mounds (see specimens in Cases C 34 to C 36), is as worthy of notice, as is the almost total absence of Surface types of spear- and arrow-heads in the Mound series.

Use of the Bow and Arrow in North America.

In practised hands the bow and arrow is a very deadly weapon. Indeed, hunters, both white and red, assert that arrows can be discharged much faster and more fatally from the bow, than it is possible to fire bullets from the rifle. In describing the dress and weapons of the chief of the Grand Paunees, it has been expressly mentioned that, although he carried a light, single-barrelled fowling-piece, it was merely for show, not for use, and was cast aside for the bow and arrow when the chase-signal was given, or the war-cry raised.* On the other hand, we are told that "the Shoshonees possess a few bad guns, which are reserved *exclusively* for war; the ordinary weapons are the bow and arrow, a lance, and a weapon called by the Chippewas, by whom it was formerly used, the poggamoggon;"† whilst "the Clatsops, Chinnooks, and other neighbouring tribes, possess a few old American and British muskets, repaired for this trade, which are reserved for hunting elk, and the few deer and bears in this neighbourhood. The most common weapon is the bow and arrow, with which every man is provided, even though he carries a gun."‡ The only weapon used by the Ceris of California is the bow and arrow; but the latter is poisoned, so that nearly every wound inflicted is fatal, or at least dangerous.§

The Gileños of California are dexterous bowmen; the bow and arrow and the club are their only weapons.‖

The only weapon used by the Pimo Indians is the bow and arrow; constant practice has rendered them excellent marksmen. Boys of ten or twelve years of age can strike a cent three

* Murray, 'Travels in N. America,' vol. i., p. 381.
† Lewis and Clarke, *l.c.*, p. 309. See ante, page 498.
‡ Ibid., p. 430.
§ Clement A. Pajaken, in 'The California Farmer,' June 13, 1862.
‖ Ibid., June 13, 1862.

times out of five at a distance of fifteen yards.* Schoolcraft tells us that Indian boys are furnished with a bow and arrows at an early age, and are induced to practise shooting, first at a mark, and subsequently at birds or small animals.† From another writer we learn that as soon as the Paunee boys are able to run about, they are taught the use of the bow and arrow, and in the barren prairies, where neither bird nor flower offers itself as a mark, their constant occupation is shooting at an arrow previously sent by one of the little party.‡

Notwithstanding this early training, Schoolcraft has stated that the North American Indians are not usually very good marksmen; he admits, however, that they are able to shoot arrows with much greater force than a white man, although the Indian possesses far less physical strength. *Wah-na-tah*, a chief of the Dahcotas, is said to have discharged an arrow with such force that it went through the body of a buffalo cow, and killed her calf on the other side.§ This is probably an exaggeration, but an arrow from the bow of a Paunee or a Cheyenne has been known to pass through the body of a buffalo,‖ and even to fly some distance, or to fall to the ground on the opposite side of the animal.¶ In the account of De Soto's expedition, it is stated that on one occasion an arrow went through the saddle and housings of a horse, and penetrated one-third of its length into the animal's body. With the Paunees it is most unusual that a few inches only of the arrow should enter the body of an animal. Unless it strikes upon a rib-bone, the arrow generally penetrates two-thirds of its length, and frequently a considerable portion of the feathered part of the arrow is buried in the carcase. Neither is the penetrating power of the Indian arrow wholly due to its being tipped with iron as at present; for the bones of men and animals have been found with arrow-heads of flint firmly fixed in them, showing the

* Bartlett, 'Explorations in Texas,' New York, 1854, vol. ii., p. 237.

† 'Archives,' &c., vol. i., p. 77.

‡ Murray, *l.c.*, vol. i., p. 316.

§ Schoolcraft, *l.c.*, vol. iv., p. 96.

‖ Ibid., *l.c.*, vol. i., pp. 77, 78.

¶ Long, 'Expedition to the Rocky Mountains,' Philadelphia, 1823, vol. i., p. 209. See also 'Prehistoric Times,' p. 419; Schoolcraft, *l.c.*, vol. iii., pp. 35, 46; Kane, 'North American Indians,' p. 141; Catlin, 'North American Indians,' vol. i., p. 31, vol. ii., p. 212; M'Kean and Hall, 'Indian Tribes,' vol. ii., p. 4; Marcy and M'Clellan, 'Exploration of the Red River of Louisiana,' p. 98.

force with which they were discharged. A human skull, found at Yoheogany, Pennsylvania, pierced with a stone arrow-head, was exhibited to the members of the American Ethnological Society, in October, 1861.* A similarly-pierced human skull is said to have been found in Scania, Sweden.

The rapidity with which a flight of arrows can be discharged by the North American tribes is very remarkable. One of the games of the Mandans consisted in shooting an arrow into the air, and then, as many others as possible were discharged before the first fell to the ground. The Indian who succeeded in having the greatest number of arrows in the air at once, won the stakes.† Indeed, the excellence of Indian archery depended upon the rapidity with which arrows could be placed upon the string and discharged, combined with accuracy of aim, whilst riding at full speed. One of the games of the Apaches tested these two qualities. Ten successive targets were made in the ground by cutting away the turf, and a "bull's-eye" of pipe-clay was marked in the centre of each target. Each competitor held ten arrows in his left hand, which he discharged from his bow, when his horse was at full gallop, as he passed the ten targets in succession. "The rapidity with which their arrows are placed upon the string and sent is a mystery to the bystander, and must be seen to be believed. No repeating arms yet invented are so rapid, nor any arm, at that little distance, more fatal." After the tenth round, each Indian claimed his arrows, distinguishing them by the private mark in their feathers.‡

In shooting, the Indian holds five or six arrows in the left hand, and as the string is pulled back, the right hand brings with it an arrow. This arrow discharged, another is seized, and, indeed, all six are shot as rapidly as one could reasonably count.§ "Had I my choice of weapons," says Mr. Lord, "I

* 'Bulletin Amer. Ethnol. Soc.,' 1861, p. 10.

† Catlin, 'North Amer. Indians,' vol. i., pp. 77, 78.

‡ Catlin, 'Last Rambles amongst the Indians of the Rocky Mountains,' pp. 190—192. The Esquimaux cut private marks upon the bone-tips of their arrows. See specimens in Case E 3.

§ The rapidity with which some of the half-breeds charge their guns is very remarkable. It is not unusual for them to shoot down three buffaloes in the space of an acre (*arpent*). In loading, they use no wadding after the first shot is fired; the piece is primed, powder is poured in at the muzzle, the bullet (of which a store is held in the mouth) is slipped down upon the powder, the saliva causing it to adhere sufficiently long for their purpose.—Schoolcraft, 'Archives of Aboriginal Knowledge,' vol. iv., p. 105.

would much rather encounter a savage armed with a trade gun than with a bow and arrows."* The Indians of the West use two kinds of arrows, the one for hunting and the other for war. The hunting arrow is armed with a leaf-shaped or triangular head, sometimes with a stemmed head, but never with one possessing barbs. The war arrow has invariably a barbed head; this is very slightly attached to the shaft, so that, if the arrow enters the body of an enemy, it cannot be withdrawn without the head being left in the wound. The hunting arrow, on the contrary, has the head firmly attached to the shaft by a binding of deer's sinew.† Barbed stone arrow-heads do not appear to be used by the Ahts of the north-west coast of America.‡

In hunting, the Indian always keeps on the right flank of the animal, so as to have the free use of his bow; when within five or six yards, he shoots one or two arrows into the loins, in an oblique direction. These arrows penetrate not less than four or five inches, and every motion that is made by the animal causes irritation and pain, by bringing a fresh place into contact with the sharp arrow-head. Should the poor beast seek relief by standing still, he becomes an easier mark for a deliberate aim, or he is left to a slow and lingering death. In shooting with ball the danger to the hunter is greatly increased; the animal feels less pain in motion than in remaining still, and he gallops either away from, or in pursuit of, the hunter, until the mortal shot is received.§

Experience has taught the hunter to launch the arrow from the bow while the body of the animal is elongated in making his forward spring; the ribs are then as widely separated from each other as possible, and there is a greater chance of sending the arrow between them.‖ The carcase of an animal belongs to the hunter who inflicted the first wound. When the Hon. C. A. Murray was hunting with the Paunees, he came up with a buffalo cow having an arrow sticking in her flank, and he left her, because, had he killed her, he would have been compelled to give up the meat and skin to the Indian who inflicted the first wound.¶ After a hunt, any buffalo found dead, without

* 'Naturalist in Brit. Columbia,' vol. ii., pp. 252, 253.

† Long, 'Expedition to the Rocky Mountains,' vol. i., pp. 290, 291. Murray, *l.c.*, vol. i., p. 385, *note.*

‡ Sproat, 'Scenes and Studies of Savage Life,' p. 82.

§ Murray, *l.c.*, vol. i., pp. 368, 369.

‖ Schoolcraft, *l.c.*, vol. iv., p. 96.

¶ 'Travels in N. America,' vol. i., p. 388.

an arrow in the carcase, or any particular mark, becomes the property of the finder.*

American stone arrow-heads are usually made of chert, hornstone, or quartz, the last being generally perfectly white, and of the variety known as "fatty" quartz. Arrow-heads of true flint have seldom, if ever, been found in America.† A place known as "Arrow Rock," on the Missouri, has received its name from the circumstance that the Indians were accustomed to obtain from it the variety of stone which they used in pointing their arrows.‡ A cavern recently discovered in the White Mountains, near Bethel, New Hampshire, is supposed to have been formed by the Indians in procuring ribboned jasper for their spear- and arrow-heads. Many of the weapons found in New England are made of this material, and until this cave was discovered the source from whence it was obtained was unknown.§ The flint or chert used for arrow-heads has not unfrequently been obtained from the secondary limestone beds, in which it occurs in nodular masses. Most of the weapons found in "Flint Island"‖ are made of this variety of chert.¶

The modern Indians of California frequently make arrow-heads from glass bottles left by the miners in the mountains. The shafts for their arrows are formed of willow-sticks obtained by the children from the banks of the streams. The sticks are stripped of their bark, and are then reduced to the proper size by being drawn between two stones with notches in them.** The Indians east of the Rocky Mountains usually make their arrow-shafts of "arrow-wood" (*viburnum*).†† The arrow-shafts of the Ahts, on the north-west coast, are generally made of pine or cedar wood, and are usually tipped with six inches of serrated bone, or with two unbarbed bone or iron prongs. The Natchez Indians use reeds for their arrow-shafts; the points are of bone.‡‡ Sometimes

* Lewis and Clarke, *l.c.*, p. 103.

† Schoolcraft, *l.c.*, vol. i., pp. 77, 78.

‡ Long, *l.c.*, vol. i., p. 100.

§ 'Bulletin Amer. Ethnol. Soc.,' Nov. 1862, p. 15.

‖ "Flint Island" is a small island in the Ohio, about twenty-three miles below the rapids. It derives its name from the great number of flint chips, broken arrow-heads, and other implements of stone, found there in turning up the soil.

¶ Long, *l.c.*, vol. i., p. 30.

** 'Bulletin Amer. Ethnol. Soc.,' March, 1862, p. 15.

†† Long, *l.c.*, vol. i., p. 290.

‡‡ Abbé Em. Domenech, 'Seven Years' Residence in the Deserts of N. America,' vol ii., p. 270.

the Indians of the North-west coast use a light variety of wood for the arrow-shaft, into which a piece of some hard kind of wood is inserted, having frequently at the top "a flint of a triangular shape, almost like a serpent's tongue, and indented like the edge of a saw."* Lewis and Clarke thus describe this variety of arrow. The Clatsops, Chinnooks, and other neighbouring nations, generally use an arrow which consists of two parts; the first is about twenty inches in length, and is formed of light white pine, with the feather at one end, and at the other a circular hole, which receives the second part, formed of some harder wood, about five inches in length, and secured in its place by means of sinews. The barb is either of stone, or else of iron or copper. If, as is sometimes the case, the arrow is formed of a single piece, the whole shaft is of a more durable wood; but the form first described is preferred, because, as much of the game consists of wild fowl on the ponds, it is desirable that the arrows should be so constructed as to float, if they fall into the water. Their bow is made of the heart of the white cedar, strengthened with the sinews of the elk, fastened on with glue made from the sturgeon.† Formerly, and sometimes even now, among several tribes of the extreme south, eagles' or vultures' talons, claws of bears, and bones of fish and animals were used, instead of flint or obsidian, for tipping arrows.‡

The Shoshonee bow is made of cedar or pine, covered on the outer side with sinews and glue. Sometimes, however, it is made of a single piece of the horn of an elk, covered on the back, like those of wood, with sinews and glue. Bows made of the horns of the mountain sheep are still more highly prized, and are formed by glueing flat pieces of the horn together, and covering the back with sinews and glue; these bows are usually loaded with a quantity of ornaments. When the Shoshonee attacks at full speed, he bends forward, and covers his body with a shield, while with the right hand he shoots under the horse's neck.§ Another writer thus describes the bows of the Shoshonees:—"The bows which I have seen were made of the horns of the mountain sheep, elk, or of wood; they are the best specimens of the skill of these Indians. When of horn, they are about

* Jacob Baegert, 'Account of the Aboriginal Inhabitants of the Californian Peninsula,' translated by Charles Rau.

† Lewis and Clarke, *l.c.*, p. 430.

‡ Domenech, *l.c.*, vol. ii., p. 269.

§ Lewis and Clarke, *l.c.*, pp. 310, 311.

two feet ten inches in length, and when unstrained have a curve backwards. They consist of two pieces, spliced in the centre with deer-sinews, and made firm and strong with sturgeon glue. The horn is brought into shape by heating and wetting; it is scraped smooth with sharp stones, and is then straightened by being drawn between two rough stones. At the middle, where the bow is spliced, before winding the splice, two deer-sinews are strongly glued and secured; these sinews cover the whole width of the back of the bow. The string is of twisted sinew, and is used loose, and those using this bow require a guard to protect the hand which holds it."*

The bows of the Californians are more than six feet in length, and are frequently made from the roots of willows.†

The Aht bow is made of yew or crab-apple wood. The string is a piece of dried seal-gut, deer's sinew, or twisted bark.‡ The elasticity of many of the Indian bows arises from the use of the ligament obtained from the fore-leg of the elk. This is fastened, in some districts, to the wooden framework by a glue made from the skin of the "white" salmon. When it has once hardened, this glue does not redissolve if exposed to moisture. This elastic band acts like an india-rubber spring, and propels the arrow with great force.§

The bows of the Ogillalla and Brulé Sioux, Arapahas, Cheyennes, and most of the Indians east of the Rocky Mountains, it has been stated, will drive an arrow through a two-inch plank.‖ This may be an exaggeration. These bows are frequently made of hickory or hop-horn-beam wood (*Ostrya Virginica*), or of the tough and elastic wood of the "bois d'arc," the Osage orange (*Maclura aurantiaca* of Nuttall); the latter being greatly preferred. The cord is of twisted sinews of the bison or elk.¶

American archæologists, with some exceptions, do not appear to have collected flint flakes and the ruder stone implements; this, perhaps, has arisen from the great abundance of more highly-finished specimens in America. The very small number

* Wyeth, quoted by Schoolcraft, 'Archives,' &c, vol. i., p. 212, plate lxxvi. figs. 1, 2.

† Baegert, *l.c.*

‡ Sproat, *l.c.*, p. 82.

§ Lord, 'Naturalist in Brit. Columbia,' vol. ii., pp. 252, 253.

‖ 'Home of the Crows,' Philadelphia, 1868, pp. 188, 189.

¶ Long, *l.c.*, vol. i., pp. 290, 291. Marcy and M'Clellan, 'Exploration of the Red River of Louisiana,' Washington, 1853, p. 98.

of flint flakes in the "Squier and Davis" Collection, and the absence of hammer-stones, stone picks, and even of stone gouges, is remarkable, and the more so because flint flakes have been applied to many useful purposes by the North American tribes. We learn from Lewis and Clarke that the Shoshonees instead of a knife "use a piece of flint with no regular form, and the sharp part of it not more than one or two inches in length; the edge of this is renewed, and the flint itself is formed into heads for arrows, by means of the point of a deer's or elk's horn, an instrument which they use with great art and ingenuity. They do not possess axes or hatchets; all the wood is cut with implements of flint or elk horn, the latter of which is always used as a wedge in splitting wood."* The elk horn implement (flaker) above mentioned was, probably, employed for removing flakes by *pressure*.† From another passage we learn that one of the hunters (Drewyer), attached to Lewis and Clarke's expedition, captured some Shoshonee spoils, among which were "an instrument made of bone for manufacturing flints into heads for arrows, and a number of flints themselves; these were much of the same colour and nearly as transparent as common black glass, and when cut the material detached itself into flakes, leaving a very sharp edge."‡ This so-called flint was probably obsidian.

A few sites have been mentioned by American archæologists upon which the manufacture of flint implements appears to have taken place. Mr. Lapham, for instance, tells us that he found on the beach upon which the city of Konosha is in part built, "abundant evidence of a former manufactory of arrow-heads and other articles of flint. Several perfect specimens were collected after a little search, besides numerous fragments that appear to have been spoiled in the process of chipping them into form. "It is not easy," he adds, "to conceive how such work could be done at all with the scanty tools of the natives; and we are not surprised to find that there are many failures. Many different kinds of flint, or more properly of chert, appear to have been wrought at this place. It is quite probable that the pebbles along the shore of the lake furnished the material. These pebbles here constitute a portion

* Lewis and Clarke, *l.c.*, p. 312.

† See pages 79—84.

‡ Lewis and Clarke, *l.c.*, p. 298. This capture was effected August 21st, 1805.

of the drift, being associated with the tough blue clay that underlies the sand, and is the substratum of the entire district. The clay is carried away by the dashing waves, leaving a beach of pebbles." *

It is probable that some of these pebbles may have been used as hammer-stones for flaking the chert. Hammers of this kind are comparatively abundant in Great Britain, Ireland, and elsewhere in the Old World; it is believed that they were used for flaking by *percussion*.† These pebble-hammers were, probably, held in the manner shown by Fig. 124, between the first finger (or first and second fingers) and thumb, at the places indicated by the depressions. The blow was delivered by the small end of the pebble, as is evident from the bruising at that part. A series of these stone-hammers, from Ireland, may be seen in Case A 26.

FIG. 122.

FIG. 123.

FIG. 124.

Hammers intended for other purposes appear in some instances to have been held in a similar manner. Fig. 125 represents a stone hammer, found in Ireland, No. 10, Case A 26, which has an artificially-formed depression on each surface, doubtless to adapt it for use in the hand, without a haft.

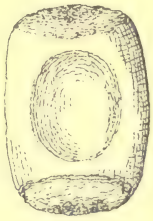

FIG. 125.

The site of a manufactory of pottery and arrow-heads has been observed in the neighbourhood of Chattanooga, Tennessee, where several acres are covered with fragments of broken pottery, burnt clay, flint flakes, chips, and arrow-heads, many of which were spoilt in making.

* 'Antiquities of Wisconsin,' p. 6.

† See pages 77—78, and 84.

Broken stone hammers; stone and clay pipes; flat, circular discs of stone, &c., are also frequently found.*

Mr. Lord found flint implements near Fort Walla-Walla, on the great plain of the Columbia, as well as chips and flakes, showing that the manufacture had been carried on at the spot. The material, however, must have been brought from a great distance. Mr. Lord thinks that a regular trade was carried on between the inland tribes, and the tribes on the seaboard and the lower parts of the Columbia, not only in flints, but in *dentalia*, mother-of-pearl, and a species of barnacle parasitic on the back of the whale; for he dug up these *marine* objects from a gravel bank, with arrow-heads, flakes, and scrapers of flint, near Fort Colville. The flint must have been brought a very long distance. It is not found *in situ* in any district in the neighbourhood.†

Some of the Indians of California use sharp flints for cutting cane or wood, and for skinning animals. "With the same flints they bleed or scarify themselves, and make incisions for extracting thorns and splinters which they have accidentally run into their limbs."‡ The Dahcotas generally bleed patients by scarifying with a flint flake; sometimes, however, they put a bandage round the arm, and use an instrument resembling a fleam, similar to that employed for bleeding horses, only smaller. It consists of a sharp piece of flint (the point of a knife, filed off and sharpened, has now superseded the flint), attached to a handle. The point is held over the vein, and, by a blow, is driven into it as far as the handle will permit.§

Florida.

Cases D 19 and H 20.

D 19.

Upon Tablets 8 and 10 are some objects made from shell, found in a shell-mound,‖ Florida. Upon Tablet 8 (S and D 47) is a disc of shell, two inches in diameter, with a central hole; perhaps this object was intended to be worn as an orna-

* M. C. Read, in 'Smithsonian Report,' 1867, p. 401.

† 'Naturalist in British Columbia,' vol. ii., pp. 103, 104.

‡ Baegert, *l.c.*

§ Schoolcraft, 'Archives,' &c., vol. i, p. 253.

‖ Pages 193—200.

ment in a similar manner to the shell necklet from one of the Salomon Islands, in Case D 7. Upon Tablet 10 (S and D 45 and 46) are two pendants made from the columella of some large marine shell. The fragments of shell rings, *b*, *c*, and *d* (S and D 48), upon Tablet 8, and the marine shells upon Tablet 9 (S and D 49), all from New Mexico, are shown for comparison. Some of the shells on Tablet 9 are in process of manufacture. In Case D 7, upon Tablet 18, are some shell armlets, from New Guinea, which serve to illustrate the rings upon Tablet 9.

H 20.

No. 2 (S and D 3) is a cooking vessel of coarse black ware, found in Florida.

H 19.

Upon Tablet 1 are fragments of pottery found in the State of Iowa.

Upon Tablets 2 to 5 (S and D 5) are fragments of pottery from various parts of the United States.

Upon Tablets 6 to 8 (S and D 6) are fragments of pottery, showing the impression of the baskets or mats in which the vessels were formed, United States.

H 21.

Upon Tablets 1 to 5 (S and D 7) are fragments of pottery, slightly ornamented, United States.

Upon Tablets 6 to 7 (S and D 15) are fragments of pottery, found in Pennsylvania.

E 9.

No. 9 is a vessel of black ware, ploughed up in the Mississippi Valley, and presented to the Collection by the Rev. E. Caswall.

California.

Cases A 42 and H 12.

A 42.

Nos. 15 to 22 in this Case are from California, and were presented to the Collection by Captain Oliver Eldridge, of San

Francisco. No. 15 is a grooved stone axe, in process of manufacture from a seaside pebble, which was somewhat of the shape of the implement intended to be made from it. This pebble was rendered more symmetrical by "pecking," and a groove was worked around it by the same process. When finished, the "pecking" marks would have been more or less removed by grinding, as with Nos. 16 and 17. These axes were hafted by bending a withe around the groove.* In some instances raw hide was probably placed over the withe, which, shrinking as it dried, would have held the axe-head firmly in its place.† Implements and weapons hafted in this manner are still in use in North America and elsewhere. No. 20, in Case C 40, is a modern example; it was obtained by Mr. Marcou, in August, 1853, when he was crossing the prairies to the north of Texas. He procured it from the Kioways, a branch of the Commanches.‡ The iron battle-axe, from Africa, No. 12, Case H 17, is secured to its handle by hide, which must have been in its raw state when it was wrapped around the weapon.

Nos. 18 to 22 are stone pendants and other objects, found in a mound, about thirty miles to the south of San Francisco. No. 22 is drilled for suspension.

H 12.

Nos. 1 to 5 and No. 10 (S and D 459), are stone mortars, used for crushing maize. These mortars are seaside boulders, which have been hollowed by "pecking." Nos. 6 to 9 are stone pestles, for use with the mortars. Nos. 1 to 9 were presented to the Collection by Captain Oliver Eldridge.

"Pecking."

The characteristic marks of this process may be detected upon many stone implements, such as pestles, mortars, hatchets, and axes. A pointed tool, of some hard variety of stone, was used for "pecking;" the tool, when in use, was held in a direction perpendicular to the surface to be worked, and not at an angle with it, as when a chisel was the tool employed.

* See pages 557, 558.

† F. Peale, 'On the Stone Implements of the Indians of N. America,' in 'Trans. Amer. Phil. Soc.,' June 21, 1861.

‡ 'Matériaux pour l'Histoire de l'Homme,' vol. ii., pp. 331, 332.

From the number of fragments of implements which have been found, it is clear that many must have been broken in the process of manufacture. It is also evident, from the numerous unfinished specimens which have been met with, that the characteristic unsustained labour of savages caused many implements to be abandoned with careless indifference in an unfinished state, after considerable time and labour had been bestowed upon them.

Modern stone-cutters work granite and certain varieties of sandstone by "pecking." With marble and some other kinds of stone it is necessary to "lift off" chips with the chisel, instead of crushing and destroying the surface by "pecking." Holes were sometimes worked in detached masses of rock, or even, when in convenient positions, in rocks *in situ*, by the process of "pecking." These were used as mortars, in which maize was crushed. The mortice-holes in the lintel-stones at Stonehenge were, probably, worked by "pecking," for the marks of a pointed tool are to be seen within one of the mortice-holes of the fallen impost of the central trilithon. The "cup-cuttings" mentioned at pages 486 to 496 appear to have been all made by "pecking."

Flint implements are often found in the auriferous deposits of California, and some of these are highly finished.* A very fine spear-head of obsidian, about seven inches in length, is preserved in the Christy Collection; it was found near the river San Joaquim, California, and was presented by M. C. L. Steinhauer. In form it resembles the obsidian spear-heads upon Tablets 22 to 24, Case B 33, found in Mound No. 9, "Clark's Work."† Fremont mentions some Indians, on the Rio de los Angelos, Upper California, who possessed arrows "barbed with a very clear, translucent stone, a species of opal, nearly as hard as a diamond;"‡ probably obsidian.

Canada.

B 30.

Upon Tablet 1 are pieces of worked elk-horn; *a* is made into a chisel. Upon Tablet 2 are some bone tools; *a* and *b* are bone awls, used to pierce the birch bark for canoes, preparatory to

* W. P. Blake, 'Proceedings International Congress, Prehist. Archæol.,' Paris, vol. i., pp. 101, 102.

† See pages 366 and 449.

‡ 'Second Expedition,' p. 267.

sewing it together; *c* is a bone chisel. Upon Tablet 3 *a* is a clay bead; *b*, *c*, *d*, and *e* are bone beads, probably intended to be strung and worn as ornaments. Such specimens as *d* and *e*, however, may have been applied to other purposes, for instance, as studs or buttons. See a similar piece of bone, used as a button, attached to a New Zealand flute, No. 3, Case H 23. Upon Tablet 3 *f* is part of the stem of a smoking-pipe. Upon Tablets 4 to 9 are flint arrow- and spear-heads. The specimens upon Tablets 1 to 9 were presented to the Collection by Mr. E. A. Gaviller, of Ontario, by whom they were found. The objects upon Tablets 1 to 3 were found in heaps of ashes, upon the site of an Indian camp, county Simcoe, Ontario. The flint arrow-heads were chiefly found in county Brant. The leaf-shaped flint implement, *a*, upon Tablet 5, may be a knife; the point is too thick for this object to have been used as the head of a spear; moreover, all the evidence of wear is at the broad end. It was found by Mr. Gaviller on the Grand River, below Brantford. It may be noticed that the arrow-head, *a*, upon Tablet 7, has been worked to a *rounded* end, instead of a point. A stemmed flint arrow-head, rounded at the end, and very finely chipped at the rounded part, is preserved at the Mercantile Library, St. Louis, Missouri.* The arrow-head, *b*, upon Tablet 7, appears to have been broken and re-pointed several times; very little of the blade is left. The edge of the specimen, *b*, upon Tablet 8, is nicely serrated. Possibly *c*, upon Tablet 9, may not have been used as an arrow-head; the edges are much worn, as if from scraping bone. Upon Tablet 10 is a triangular stone arrow-head. Upon Tablets 11 to 27 are flint and stone arrow- and spear-heads.

A 42.

Nos. 23 to 27 in this Case are from Canada. No. 23 is a wedge-shaped stone hatchet, found in Upper Canada; it is very flat on the under surface, and was presented to the Collection by the late Mr. G. Witt, F.R.S. Nos. 24 and 25 are wedge-shaped stone hatchets. Nos. 26 and 27 are grooved stone axes. Nos. 24 and 25 were found in county Brant, by Mr. E. A. Gaviller, by whom they were presented to the Collection. No. 27 was presented by the late Dr. Fowler, F.R.S.

* Mr. Blackmore has sketched this specimen from the original, which measures an inch and three-quarters in length, and an inch and a quarter in width.

This completes the description of the Stone Age Collection in the Blackmore Museum. The Bronze objects and the Illustrative Series of modern "Savagery" may possibly be described in another volume. The following is an outline of the present arrangement of this portion of the Collection :—

BRONZE SERIES.

Ireland.

A 55 to A 57.

Copper and bronze wedge-shaped celts, bronze palstaves, socketed celts, gouges, &c.

C 44 and C 45.

Bronze spear-heads,

E 15.

Bronze knives, daggers, swords, and arrow-heads.

England.

A 58.

Copper and bronze wedge-shaped celts, bronze palstaves, socketed celts, gouges, &c.

E 16.

Bronze daggers.

France.

A 59 and A 60.

Copper and bronze wedge-shaped celts, bronze palstaves, socketed celts, &c.

E 16.

Bronze axes, daggers, and swords.

ILLUSTRATIVE SERIES.

A 53.

Stone hatchets and weapons from New Zealand and Australia.

A 54.

Stone and shell hatchets, from New Caledonia, Salomon Islands, &c.

C 40, E 2, AND H 4.

Hafted stone hatchets, from British Guiana, New Zealand, Australia, Society Islands, Hervey Islands, &c.

C 40, C 41, AND E 3.

Stone-tipped arrows and spears, from the neighbourhood of Behring's Straits, Alaska, California, New Caledonia, &c.

E 4, H 13, AND H 14.

Bone-tipped arrows and spears in use by the Esquimaux, &c.

H 12.

Examples of the use of sharks' teeth for arming weapons, from the Kingsmill Islands, &c.

H 18, AND R 12 TO R 14.

Iron-tipped spears and arrows, from various parts of Africa, &c.

C 40 AND H 17.

Iron swords, daggers, knives, and axes, from various parts of Africa, &c.

H 9.

Masks and paddles from the north-west coast of America.

R 8.

Paddles, clubs, darts, blow-tubes, &c., from British Guiana.

H 23 AND R 11.

Chiefs' staves, hatchets, paddles, and other objects, from New Zealand.

R 2 AND R 6.

Paddles from the Society Islands

H 8.

Clubs from the Friendly Islands.

H 3, H 15, AND R 1.

Spears, clubs, boomerangs, and shields from Australia.

H 9 AND H 10.

Spears, darts, clubs, and shields, from the Salomon Islands.

R 3.

Paddles and clubs from the Marquesas Islands.

R 4 AND R 5.

Darts, bows, and paddles from New Guinea.

R 7.

Spears and clubs from the Fiji Islands.

R 9 AND R 10.

Spears, clubs, paddles, &c., from various Polynesian and Melanesian localities.

D 7.

Examples of the use of shell for ornamental purposes.

D 6.

Examples of the use of shell and bone for making fish-hooks, &c.

D 5.

Bone skin-scrapers, and other objects in use by the Esquimaux.

D 4 AND D 5.

Examples of the use of ivory and the teeth of animals for ornamental purposes.

MANUFACTURE OF GUN-FLINTS.

D 1.

In this Case specimens of modern flint-working, such as gun-flints and strike-a-lights, are shown. At the request of the present writer, Mr. James Wyatt, F.G.S., of Bedford, has written the following valuable paper upon the present manufacture of such objects. Mr. Wyatt is himself an accomplished flint-worker, even with no other hammer than a conveniently-shaped stone or pebble. He has, moreover, donned the apron and worked away steadily in one of the Brandon sheds, making gun-flints sufficiently well to warrant the belief that, with moderate application, he might ultimately succeed in earning ten shillings or twelve shillings per week at the trade. His paper, therefore, has the great advantage of being based upon a practical knowledge of the subject, and is not founded upon mere report. The information furnished by Mr. Wyatt, as to prices and other business details, was obtained direct from Mr. Snare, of Brandon, whose likeness, representing him in the act of "quartering" a flint, may be seen in this Case; in which is also a photograph of S. Dorling, the best "knapper" in Brandon, taken whilst at his work.

Modern Flint-Working.

It is interesting to be able to show that there is a link to connect the present with the past in the investigation of the subject of the utilisation of flint in connection with the arts of both war and peace. Although, in the construction of weapons and implements, a great revolution was effected by the discovery of metals, flint was extensively used in many countries for various purposes down to a comparatively late period. Until

within a quarter of a century from the present time, as is well known, the muskets and rifles for the armies of civilised nations, the guns and fowling-pieces of sportsmen,* and even the process of obtaining a light for the household, were all dependent upon articles constructed from flint. The wonderful chemical discoveries of the present age, which in this respect culminated in the detonating powder, the percussion cap, and the lucifer match have not, however, as yet completely abolished the use of that natural production which has been of such inestimable value to man from, perhaps, the earliest period of his history. There is still in England (and was until very lately in France) a manufactory of articles in flint, and as this will, in all human probability, be superseded in the next generation, it is desirable to secure a record of it. The manufacture is now almost entirely confined to the construction of gun-flints, strike-a-lights, and facing-cubes for ornamental buildings. Near the city of Norwich there is a small trade still continued, but the chief manufactory is at Brandon, in the county of Suffolk, where it has been carried on for centuries. At this time (1870) there are three masters and thirty workmen here engaged in this trade.

* The first portable fire-arms were discharged by means of a match, which, in the course of time, was fastened to a cock, for the greater security of the hand while shooting. Afterwards a piece of iron pyrites was screwed into the cock, and a steel plate or small wheel, which could be cocked or wound up by a particular kind of key, was applied to the barrel. But, as an instrument of this kind often missed fire, a match, till a late period, was retained along with the wheel, and it was not until a later time that a piece of flint was substituted for the friable pyrites. In the year 1586, Julius, Duke of Brunswick, caused iron pyrites to be collected near Seefen for use with fire-arms, and he even made some pieces into the requisite shape with his own hands, "though in doing so he often bruised his fingers, and was advised by the physicians not to expose himself to the sulphureous vapour emitted by that substance."—See Beckmann, 'Hist. of Inventions,' Bohn, vol. ii., p. 539. At Dresden there is still preserved an old kind of gun, called a *Büchse*, on which, instead of a lock, there is a cock with a flint placed opposite to the touch-hole, and, when the weapon had to be discharged, this flint was rubbed with a file till it emitted sparks and ignited the powder.—Beckmann, *l.c.*, vol. ii., p. 534, *note*. It is stated that muskets with flint-locks, instead of match-locks, were not supplied to the soldiers in the Duchy of Brunswick until the year 1687.—Beckmann, *l.c.*, p. 536. In France, the miquelet gun-lock, a Spanish invention, was first introduced in 1630, but the stone, if flint was used at that time, had not, at all events, been subjected to any manufacturing process. In 1703, fire-arms had undergone a complete metamorphosis. The soldier was armed with a musket; but it was his duty to find his own flints, which, however, he often used in their rough state. It was not until 1719 that gun-flints began to be regularly manufactured in France.

This little town gives the best evidence of commercial antiquity that can be produced anywhere, as well as the best evidence of "continuity," for there is no doubt that the earliest works of art extant—the implements of the drift—were constructed here by the old flint folk. When, therefore, in a future age, Lord Macaulay's pre-vision is realised, and his anticipated traveller from New Zealand "sits on a broken arch of London Bridge, to sketch the ruins of St. Paul's," he may be induced to extend his archæological tour, and view with reverential interest the chalky slope of Brandon, whence came the flints for the rifles of his Maori countrymen in the nineteenth century.

The persistent flint manufacture at Brandon is doubtless due to the superior quality of the raw material found there.* In the Upper Chalk, through which the Little Ouse has cut its way, there are thin deposits of tabular flints, which are more homogeneous in structure, and more free from fossils, than is generally the case with those found in other districts in the area of the Cretaceous formation. The flint is almost black in colour, is lustreless where fractured, nearly opaque, and possesses the valuable characteristic of "running" into long flakes when struck at the angle of the block or core. It is in fact more tractable in the hands of a workman than flints which are parti-coloured or fossiliferous. There is much care bestowed on the quarrying of this raw material, as well as in the preservation of it under cover. It works best when fresh from the bed,† and in the winter season it is sometimes found necessary to dry the nodules, and warm them up to a moderate temperature,‡ or

* In France, the best flints are said to have been obtained "in the neighbourhood of St. Agnau, in the department Loire-et-Cher, and in that of the Indre, and the departments that occupy the valleys of Seine-et-Marne."—Rees' 'Cyclopædia,' article, 'Flint.' The Archives of the Depôt Central de l'Artillerie contain various reports, from which it appears that the localities where flints might be manufactured for the army were only selected after a searching inquiry into the quality of the flint found in the district. These places were Meusne, Couffy, Pouillé, Angé, Châtillon, Noyers, Langon, Lyes, Paulmey, Lucion, and Valencay. Meusne was the central point where the artillery officer, charged with the care of examining and accepting the gun-flints for the service, was stationed. The only other places mentioned as furnishing a good quality of flint are Moyesse and St. Vincent (Ardèche), Cérilly (Yonne), and La Roche Guyon (Oise). The quality of flint obtained at these places was considered to be so good that exportation was prohibited.

† See pages 441—443.

‡ In France, before attempting to flake the flints, they were externally dried by exposing them to the heat of the sun; in wet or cold weather they were placed before a fire.

they prove stubborn in the process of flaking.* The best flints obtained at the present time are at a spot about a mile to the south of Brandon, on the ridge of uncultivated land known as the "Ling Heath," and they are found in the chalk in layers, varying from five inches to eighteen inches in thickness, and generally three of these layers of good flint are attainable. The estate was an early charitable bequest, and is held in trust for the benefit of the poor of Brandon, the proceeds being now applied to the purchase of coal for about two hundred persons in winter.

The mode of getting the flint is very primitive, and quite uninfluenced by any of the modern schemes of division of labour or systematic working. The excavator always works alone, preferring that plan, with all its disadvantages, to any other which would give him a partner in the speculation. Like the gold-diggings, some "prospects" are more profitable than others. The surface levels and the dip of the beds greatly influence the amount of excavation required, and in some parts the layers of the flints are thicker and of better quality than in others. The process of obtaining and working a site is curious. A digger selects a spot, and having obtained the permission of the trustees, he, without paying any royalty or fee, proceeds to sink a pit about fifteen feet long and five feet wide, and when he gets about five feet deep, he commences a similar excavation below, but in a direction across the line of the upper one, and continues in this way by stages down to the lowest depth required; the mode of communication is, therefore of a zigzag character. Some of the pits are forty feet deep, and as most of them have tunnels or drivings, a great portion of the heath is now thoroughly honey-combed. The digger tunnels a certain distance (according to the limits of his "take," or lot), and when he has exhausted the flint-bed of one stage, he works down to the next of the series.†

* A flake is simply a splinter of flint skilfully struck off from a block. The mode of doing this may be seen at the gun-flint makers, who are now the only makers of flint implements in this country. A polygonal block is first formed, from the angles of which flakes are dislodged by successive blows of a pointed hammer. By this process flakes can be struck off until the block is nearly used up. In all these flakes you can trace the manner in which they have been made, because at the point at which the blow was administered there is always a certain projection, or "bulb of percussion," as it is called, showing the place where the hammer was applied.—Evans, 'Man and his Earliest Known Works,' a paper read at the opening of the Blackmore Museum, 1867.

† "On the banks of the Cher (France), the flints are excavated by means

The flints are found in the form of large flat nodules, some of them weighing from two to three hundredweight. As the digger declines any participation or partnership in his venture, he is unable to avail himself of the advantage of any mechanical method of raising the flint to the surface. Accordingly, after having dug a certain quantity, he is obliged to raise the lumps with his hands, place them on his head, and heave them on to the stage above. When that stage is full, he gets up to it, and goes through the same process of lifting to the next, and so on until he reaches the surface. His heap is then surveyed by the flint manufacturer, who purchases the workable lumps at the rate of 6s. 6d. per "jag," the local term for a one-horse-cart load, which contains about a ton weight of flint. On this quantity the manufacturer pays 1s. 8d. "groundage," or royalty to the trustees, and 1s. 10d. for cartage to his workshops in the town. The raw material, therefore, costs on an average 10s. per ton. There are other places in the district whence the flints are obtained, as Weeting, Santon Downham, and Icklingham, and it is not improbable that the curious excavations in this neighbourhood, known as "Grimes' Graves," and some other reputed earth-dwellings of an early people, are merely the shafts sunk by the flint-workers of bygone periods.*

In the manufacture there is a great proportion of waste, even of the selected flints. Such as display any variation from the dull black colour are squared up for facing-stones for church walls and ornamental buildings. These finished cubes sell at about the rate of 2s. 9d. per cwt.

Notwithstanding the reduction in the demand for gun-flints, there is still a great variety, and the trade classification is very exact. When the cost of the material, the skill in the manipulation, the care in the selection of the sizes and forms, are taken into consideration, it is astonishing to find that a profit

of shafts of forty or fifty feet in depth, from which horizontal galleries are carried into the only good stratum which is known in that district."—Rees' 'Cyclopædia,' article, 'Gun-flint.' In parts of France three or four workmen used to join for the purpose of excavating flint for the gun-flint makers. They would first dig a trench, about six feet in length and depth, and about two feet in breadth; then they would make a second trench lower than the first, and so on, like the parallels of siege-works, till they got to the depth of from thirty to forty feet, where the flint nodules were found embedded in a soft kind of chalk.

* Canon Greenwell has examined some of the hollows (Grimes' Graves), and in sinking a shaft he cut through a stratum of loose flint refuse, about three feet in thickness. I am indebted to Mr. H. Prigg, jun., for the above information.—E. T. S.

is made on the wholesale prices, which average about 4s. for a thousand gun-flints! Even at this time there are twenty-three different kinds of the gun-flints of commerce, besides two kinds of strike-a-lights. The former are classed as—No. 1, small common gun; 2, second single; 3, fine single; 4, super single; 5, super double; 6, fine pocket-pistol; 7, super pocket-pistol; 8, second double; 9, fine double; 10, second horse-pistol; 11, best horse-pistol; 12, double-edge horse-pistol; 13, double-edge carbine; 14, double-edge musket; 15, second carbine; 16, best carbine; 17, black common musket; 18, second musket; 19, best musket; 20, grey musket; 21, large common gun; 22, common carbine; 23, grey mixed musket.*

On the spot it is stated that in the old war times the price averaged a guinea per thousand, as paid by the British Government and the East India Company; now some of the same varieties do not realise more than 2s. per thousand at the wholesale price.

The manufacture of these articles is peculiarly interesting,

* Examples of these varieties of gun-flints, presented to the Collection by Mr. Wyatt, are shown in Case D 1, Nos. 1 to 9, corresponding with the qualities mentioned in the text, on Tablet 25, Nos. 10 to 15 on Tablet 26, Nos. 16 to 21 on Tablet 27, and Nos. 22 and 23 on Tablet 28. Upon Tablet 28 is also shown a gun-flint of large size, used for duck-guns, in boats. Upon Tablets 16 to 22 are some specimens of gun-flints, presented to the Collection by Mr. H. Prigg, jun. Upon Tablet 16 *a* to *c* first quality small single, *d* to *g* third quality small single. Upon Tablet 17 *a* to *c* first quality horse-pistol, *d* to *f* second quality horse-pistol. Upon Tablet 18 *a* to *c* first quality carbine, *d* to *f* first quality double-edge carbine. Upon Tablet 19 *a* to *c* second quality carbine, *d* to *f* third quality carbine. Upon Tablet 20 *a* to *c* first quality musket, *d* first quality double-edge musket. Upon Tablet 21 *a* to *c* second quality musket, *d* to *f* third quality musket. Upon Tablet 22 *a* first quality duck-gun, *b* and *c* second quality duck-gun. Old gun-flints are shown on Tablets 33 and 35. The proper sizes for gun-flints, we are told, are as follow:—For a musket, an inch and five-eighths in length and an inch and a quarter in breadth; for a carbine, an inch and a quarter in length and an inch in breadth; for a pistol, rather more than an inch in length and three quarters of an inch in breadth. We are, perhaps, scarcely able fully to appreciate the inconvenience likely to arise from the use of the flint-lock. A writer in Rees' 'Cyclopædia' makes the following remarks upon the subject:—"All military men must know that nothing is more adverse to the operations of a regiment than the necessity (which too often occurs in consequence of the proper form of gun-flints not being sufficiently attended to) for men to quit their ranks for the purpose of either hammering or changing their flints. To the brave man such a necessity is painful, as well as dangerous, while to the less resolute it serves, at least, for a pretext to pass into the rear, or eventually to relinquish his post altogether."

especially as the waste cores, * fragments, and flakes † at once attract the attention of the antiquary as being of identical forms with the pieces of flint found in caves and ancient deposits, and give a key to the solution of the question of the construction of the knives and tools of the very ancient people. Some of the waste flakes of Brandon are scarcely distinguishable from the relics of the caves, except by the coating which Time, and the soil in which they were embedded, have given to the latter.

In the modern manufacture ‡ the first process in the workshop is, by means of a large hammer, weighing seven or eight pounds (see No. 1), to quarter or divide the large flint into convenient blocks, and then, with a small round-faced hammer (called the English Hammer), to dress up the block, chip off the white skin or rind, and remove rough portions of the flint on one side, so as to obtain a face down which flakes can be struck off. The next tools used are called "flaking-hammers," one of which has a heavy head of iron, about three pounds and a half in weight, with square steel faces (see No. 3). The hammer-head gradually decreases in size from the centre to the faces, which measure only half an inch by one-eighth; there is another of the same form, but of smaller dimensions, which weighs about half as much as the larger one. The force generally given to detach a flake is equal to about twice the weight of the large hammer. Coming to the process of flaking, the workman rests the mass of flint on his left knee, and with one smart tap on the corner of the flint—the hammer being directed at an angle of about 45 deg.—strikes off a flake the whole depth of the flint, if its running quality be good. The operation is repeated, so long as the block will yield flakes of any size. The waste chips are used for top-dressing to foot-paths, the shapeless refuse lumps for road-making, and the larger pieces for rubble-work in buildings. The flake struck off as just described always exhibits a little swelling or knob at the

* Gun-flint refuse, from Brandon, is shown in bottles Nos. 6 and 7; from Clarendon, near Salisbury, upon Tablets 37 to 39.

† Knappers' flakes, from Brandon, are shown upon Tablets 13 to 15.

‡ Alluding to the manufacture of gun-flints, Beckmann remarks :—"Many of my readers will perhaps be desirous to know in what manner our gun-flints are prepared. Considering the great use made of them, it will hardly be believed how much trouble I have had to obtain information on the subject. One would laugh were I to repeat the various answers which I obtained to my inquiries. Many thought that the stones were cut down by grinding them; some conceived that they were formed by means of red-hot pincers; and many asserted that they were made in mills."—'Hist. of Inventions,' vol. ii., p 537.

spot where the percussion took place; indeed, the presence of such a lump on a piece of flint may be taken as evidence that it was produced in that manner, and the absence of it is equally good proof that the fragment was merely shattered from a block.

The workman occasionally files up the faces of the hammer, so as to keep them square, and enable him to strike with precision. The blow may be given with either corner of the square face. A good workman, with the best material at hand, can strike off nine thousand flakes in a day; but this is an extreme case. The average, probably, is about seven thousand. The flaker is paid by the thousand. As the flakes are made they are thrown into little tubs, according to their sizes and forms, the practised eye of a good workman enabling him to tell at a glance the special adaptation of every kind of flake struck off. The flakes are put into the hands of another workman, called the "knapper," whose occupation involves very clever manipulation and a thorough knowledge of the peculiarities of the material operated upon. He sits at a bench on which is fixed a small iron anvil, technically termed a "stake." This stands up from the bench about three inches; the face of it is an inch and a quarter by three-eighths of an inch, and is set obliquely. (See No. 5.) The face of the hammer is also set obliquely, so that the flint coming between is operated upon as by the action of a pair of shears, intensified by percussion. The knapping-hammer is made of fine steel: those constructed from nine-inch flat files are considered the best. The head of the hammer is thin, and is eight inches in length by one inch and a quarter in width. (See No. 4.) No other form of knapping-hammer has ever been known to the present workmen in Brandon.

The flake is held between the thumb and the forefinger of the left hand, and laid across the stake. One smart blow detaches the rough end with a clean cut, and another blow severs a piece of the size required for a gun-flint. The edges are then neatly trimmed on the edge of the stake, every blow being smartly given, whatever the force required. All the action of striking is performed by the hand merely working freely from the wrist: the arm is never moved, the elbow being pressed on the knee to keep the action of the wrist uniform.* A good knapper can

* The tools employed by the gun-flint makers (*caillouteurs*) of France are said to have been—

1. An iron hammer, with a square head, weighing not more than two pounds, and frequently only one pound, with a handle six or eight

make three hundred gun-flints in an hour; and according to the quality of the material, the extent of his application, and the length of the day appropriated to the labour, he can earn from 10s. to 20s. a week; and so adroit are some of the knappers that even by the light of a single candle they can carry on this nice operation so as to make the working days in winter as long as those in the summer.*

The noise made by knapping is so peculiar that, when once heard and known, it is not to be confounded with that of any other artisanship. The thin steel hammer gives a musical ring at each percussion, and the divided flint accompanies this with a curt snapping sound, which is varied by an occasional little muffled thump, caused by the hammer alighting on a piece of leather fastened below the iron stake. The motion of the right hand is kept up continuously, so that when there is no flint presented, and whilst the left hand is picking up a fresh flake, the hammer is allowed to tap on the leather, which causes it to rebound, and aids in keeping up a constant action. An average

inches in length. This tool was not made of steel, as it would have rendered the strokes too hard, or, as it was termed, *dry*, and would have shattered the mass irregularly, instead of breaking it with a clean fracture. This implement answers to the present "quartering hammer."

2. A steel hammer, with two points, weighing from ten to sixteen ounces. Its handle was seven inches in length, and the head was so shaped that its points inclined inwards towards the workman. The present "flaking-hammer" resembles this tool.
3. "The disc-hammer, or roller, a small tool, called *roulette*, which represented a solid wheel, or segment of a cylinder, two inches and four lines in diameter." Its weight did not exceed twelve ounces. It was made of steel, not hardened, and a handle, six inches in length, passed through a square hole left in the middle.
4. A chisel, tapering and bevilled at both extremities, seven or eight inches in length, and two inches in width, made of steel, not hardened. This was set on a block of wood, which served as a bench for the workman. This chisel answers to the "stake" in present use.—Rees' 'Cyclopædia,' article, 'Gun-flint.'

The only place in which gun-flints are now made in France is the village of Meunes.—Steenstrup and Lubbock, 'On the Flint Implements of Pressigny,' in 'Trans. Ethnol. Soc.,' vol. v., pp. 221—227.

* The whole operation of making a gun-flint is performed in less than one minute. A good workman is able to make a thousand good flakes a day (if the flints be of good quality); and he can make five hundred gun-flints in a day, so that, in three days, he is able to flake and finish, unaided, a thousand gun-flints.—Rees' 'Cyclopædia,' article, 'Gun-flint.'

flake will produce two flints of the musket size and one of the pistol size.*

As the gun-flints are made they are thrown into tin cans, which, on being filled, are carried to the master's warehouse, and the specimens are counted out and sorted according to the regulation forms and sizes. They are then packed in casks, the smallest of which contain one thousand, and the largest fifty thousand, and are consigned to merchants in London, Liverpool, Bristol, Birmingham, Sheffield, Hull, and Wolverhampton, chiefly for exportation.† Even under the altered state of affairs, and with the reduced demand for gun-flints, there is a large quantity exported from this manufactory. A small lot is sent regularly to South America. To Brazil a large number of the musket and carbine sizes is sent;‡ and the same qualities go to the Cape and different parts of the African coast, and to New Zealand. Some still go to Spain. For the smaller kind of horse- and pocket-pistol-flints orders come from the Northern States of America, and until of late years both the Turks and Russians were good customers.§ Their demands are decreasing, and it is probable that the few flints now exported to them are mostly used for other purposes than fire-arms.

* Mr. Wyatt has marked the flakes upon Tablet 12, Case D 1, with red lines, to show the way in which they would have been divided by the "knapper."

† In the palmy days of the gun-flint trade, they were packed in small casks, called half-barrels, each of which would contain either—

2000	musket flints,	weighing	2 qrs. 14 lbs.
3000	carbine ,,	,,	2 qrs. 10 lbs.
Or, 4000	pistol ,,	,,	2 qrs. 15 lbs.

—See Rees' 'Cyclopædia,' article, 'Flint.'

‡ The Ahts of the north-west coast of America still use gun-flints. Mr. Sproat, writing in 1868, makes the following statement:—"Perhaps about three-fourths of the grown men on this coast (north-west coast of America) possess muskets, common smooth-bore *flint-lock* weapons, which are sold in Victoria at about forty shillings each. They *prefer* flint-lock guns, being apt to lose or wet percussion caps, or to run out of the supply."—'Scenes and Studies of Savage Life,' p. 81.

§ The Turks, and probably the Egyptians, made gun-flints by the tedious process of surface-chipping, an art which attained its perfection in pre-historic times, and the mode of accomplishing which is now but imperfectly known. —Thomas D. Rock, 'Technologist,' vol. ii., pp. 90—93. Specimens of surface-chipped Broussa gun-flints may be seen upon Tablet 23 *a* and *b*. The specimen upon Tablet 32 is, probably, a Turkish gun-flint. It is figured in the Archæol. Journal, vol. viii., p. 197, and is described as a rare form of flint arrow-head, found in Armagh, Ireland.

Of the articles called "strike-a-light" there is a small quantity annually exported to the East, and some to Brazil. These are cheap and convenient articles for obtaining fire under the old "flint-and-steel" plan, in places where it is difficult to procure lucifer matches and other modern inventions. They are constructed by old men and boys from the broad flakes which are not available for the superior work, and are merely circular discs, generally about two inches in diameter.*

The fabrication of these articles is a convenient and economical mode of utilising portions of the material which would otherwise become "waste."

Besides the regular workmen in this flint-trade, there are a few who are intermittent in their operations. Not being attached to either of the town shops, they take their walks abroad, and obtaining the raw material for the picking up, without payment of royalty, they sit in the open air and work off their flakes, which they carry home to knap into gun-flints at their convenience.† This will account for the large number of chips, cores, and imperfect flakes which are found in great profusion on the surface, and in heaps in curious corners, over a large area of this district. Some of these by constant exposure to the

* See specimens upon Tablet 30 from Brandon, and others upon Tablets 44 and 47, made by Ashley, of Icklingham. The specimens *a* and *b*, upon Tablet 31, are old "strike-a-lights," found near Salisbury. Upon Tablet 29 are some old "strike-a-lights," of small size, found in making a drain in St. Ann Street, Salisbury. Several varieties of tinder-box are shown. No. 40 is a wooden tinder-box of very primitive form. Nos. 41 and 42 are tinder-boxes of tin. No. 43 is a contrivance for obtaining a light by means of a wheel of steel, which could be wound up with a string; the wheel was then made to revolve with rapidity against a piece of flint. The three specimens (No. 8) are each provided with a lock which acts like that of a pistol. No. 9 is an old flint-gun-lock.

† Beckmann mentions that "shepherds, and other persons who gain little by their service, break the flint-stone merely by manual labour (for making gun-flints), and chiefly in Champagne and Picardy."—'Hist. of Inventions,' vol. ii., p. 538. At King Manor, Clarendon, near Salisbury, this intermittent mode of making gun-flints appears to have been carried on by men who obtained the flints from the chalk-pit by the side of the road. These flints were carried to the opposite bank, the sunny side of the road, and were flaked and finished on the spot, as is attested by the quantity of refuse still there. Many of the pieces of flint are the mere waste ends of the flakes, and show the square cut arising from the use of the knapping-hammer. Both operations, flaking and knapping, appear to have been carried on in the open air at King Manor.

atmosphere become a little weathered, and are occasionally mistaken by visitors for ancient specimens.*

It is worthy of remark that the fabricators of gun-flints in France never attained that high standard of art, either in flaking or knapping, which is so justifiably claimed by the workmen of East Anglia.† The specimens we have seen indicate less care in the manufacture and less economy in the use of the material. It would appear that one flake produced only one gun-flint; whereas at Brandon they make two, three, and sometimes four from a single flake, according to its length; this, of course, depends upon the "running" quality of the flint as well as skill on the part of the flaker. It does not appear that the French workman attained the true method of producing flakes with two ridges running the whole length. Nothing can be neater than the specimens produced at Brandon in each department, and the uniformity of outline of many thousands of gun-flints in a cask is very astonishing, especially when the peculiar brittle and fracturing tendency of the silex is considered.

Where so much ingenuity is displayed in subserving an apparently intractable material it would naturally be expected that some of the experts of the trade would be able to construct close imitations of the flint tools and weapons of the ancient people; but, fortunately, those who have tried have not been successful. Not a single skilled workman in Brandon has ever

* The number of flint flakes in the neighbourhood of Brandon is very remarkable; in fact, the surface of the country is perfectly strewn with them, but there appears to be a comparative absence of abortive or broken flint implements. I looked over several fields near Grimes' Graves, in company with Mr. Evans, Mr. Flower, Colonel Lane Fox, and others, and only one "scraper," now in the Blackmore Collection, rewarded the search of the entire party. Flakes in abundance, of course, were found; the large size of which, particularly their width, as compared with the flint flakes met with in most other districts, was very striking.—E. T. S.

† Beckmann says:—"Some years ago, Gilbert de Montmeau, a merchant at Troye, carried on the greatest trade with them (gun-flints), and sold them at the rate of five livres six sous per thousand. The Dutch always buy up large quantities of them, which they keep in reserve, in order to sell them when the exportation of them is forbidden by France, in the time of war. Savary, however, relates that the largest quantity and best stones come from Berry, and particularly the neighbourhood of St. Agnau and Meusne. I know, also, that a great many are made at Stevensklint, in Zeeland, and are exported from that country. In the year 1727, the Chancery of War at Hanover sent some persons to learn the art of breaking flints, but after their return it was given out that our horn-stone was unfit for that purpose."—'Hist. of Inventions,' vol. ii., p. 538.

succeeded in producing the beautiful conchoidal waves, crimpings, and ripplework displayed on the surface of tools and weapons found in Scandinavia, and on the barbs and arrow-points of a still earlier period.* There is a limit to the constructive skill of the modern knapper, and, happily to the mischievously directed ability of forging impostors; and it is a curious fact that the climax of high art in flint-work was attained at a period generally described as barbarous, then was lost as civilisation advanced, and now the *modus operandi* seems altogether irrecoverable. The fine work altogether defies imitation by the highly civilised and ingenious. Even the self-sufficiency of Flint Jack quails before the exquisite specimens of antiquity as he humbly expresses the remarkable opinion that "it is a barbarous art lost to mankind."

JAMES WYATT.

BEDFORD, *Jan.*, 1870.

* The art of surface-chipping is still practised by some modern savages. See the exquisitely-made arrow-head *a* upon Tablet 10, Case D 6, which was obtained by Mr. Blackmore at Utah, in 1864; and the obsidian head to the spear, No. 3, Case C 40, obtained from Alaska, in 1869.

FORGERIES.

D 2 AND 3.

In these Cases forgeries of flint implements are shown; many of which were made *to order* by Flint Jack. A photographic likeness of this individual, taken when he was at Salisbury, in 1863, is shown in Case D 2. Much has been written about Flint Jack by Mr. Monkman, Mr. Wyatt, Mr. Llewellynn Jewitt, and others. Want of space, however, prevents more than a passing allusion to the subject of forgeries in the present work.

Mr. Evans has mentioned a distinction to be observed between counterfeits and forgeries:—"Counterfeits, *contrafacta*, being made to imitate genuine originals; forgeries, *fabricata*, though professing to be genuine, not being of necessity imitations, but frequently embodying new conceptions."* A glance at the specimens in Cases D 2 and 3 will suffice to convince the visitor that he is looking at *forgeries*, not at *counterfeits*, for there is scarcely a single example which is a good imitation of a genuine original. In particular, the absence of "surface-chipping" upon the arrow-heads will be noticed. See specimens upon Tablets 18 to 23, 27 to 29, and 33 and 34, Case D 2.

Many "amateur" forgers can make equally good, if not better, flint hatchets, arrow-heads, and scrapers than Flint Jack and his professional brethren. There were heroes before Agamemnon, and forgers of flint implements before Flint Jack. About the year 1855, "there was a manufactory of stone hammer-heads, *ancient* British urns, and flint weapons of all descriptions on the eastern coast of Yorkshire, principally carried on by one William Smith, *alias* Skin and Grief, or Snake Willy. Not only arrow-heads and celts of all sizes, but rings, knives, saws, and even fish-hooks of flint were produced, some of which have been engraved as genuine in local archæological publications. Since then the manufacture has spread south-

* 'On the Forgery of Antiquities,' 'Trans. Roy. Institution,' Feb. 24, 1865.

wards, and many are made in Suffolk. They have also been produced in Kent, and recently the most accomplished of the forgers, Edward Simpson, *alias* Flint Jack,* has made more than one public exhibition of his skill in flint-working in London. The fabrication of stone antiquities is carried on, but on a smaller scale, in the north of Ireland. There is usually a greater difference in the convexity of the two faces of the forged flint arrow-head than in the genuine examples; and in nearly all the forgeries a dulness of surface characteristic of recent fracture.

"On the Continent forgery has been practised in connection with the lake-dwellings of Switzerland, both with regard to objects in stone and in bone. Even the antiquities found in the cave deposits of France have not entirely escaped. Ancient stone implements have been socketed into ancient bones, so as to give them handles, and the result has been modern forgeries composed of genuine antiques. Even amongst the most ancient relics of human workmanship with which we are acquainted—the flint implements found in the valley-gravels of England and France—the forger has been at work; and Icklingham in Suffolk, and Amiens and Abbeville in France, have each produced their own schools of counterfeiters. The forged flint implements from Amiens† are usually of the long spear-head type; those from Abbeville ‡ are generally flatter, with a cutting edge all round, and ovato-lanceolate in form; those from Icklingham § are usually sharply pointed, flat on one side and convex on the other. Of course there are varieties of form, but at all these places they are usually produced for sale enveloped in some clayey matrix, so as to conceal the character of their surface, unless some portion of an ancient surface of flint has been left in chipping them out, in which case the old surface‖ is

* In Yorkshire, Flint Jack was at one time better known by the name of "Bones."

† See Case D 3, Tablets 1, 10, 14, and 21 to 24.

‡ See Case D 3, Tablets 3, and 6 to 8. Upon Tablet 30 is a clumsy forgery made by the workmen at Porte Marcadé. Nos. 2 and 4, Case D 3, are forgeries made by the workmen near Paris; as are also the forgeries of neolithic types. Nos. 2 and 13, Case D 2.

§ See Case D 3, Tablet 15, and Case D 2, Tablets 24 and 25. No forgeries have hitherto been attempted by the Salisbury workmen.

‖ The forgery upon Tablet 19, Case D 3, shows both old and new surface; it is a naturally fractured flint *improved* by the forger. A patch of old crust (patina) is to be seen on No. 24, Case D 3.

sometimes wiped clean, and the new left covered with mud. It is only after a thorough washing that they appear in their true colours.

"There is generally something in the form of the recent forgeries which strikes the practised eye; the method of chipping is different, the angles between the different facets sharper, and the edge also sharper, than is usual with genuine specimens. The surface is commonly dull and lustreless; and if a portion be chipped off there is no perceptible difference between the recent fracture and the rest of the surface."*

Naturally Fractured Flints.

The specimens Nos. 33 to 56, Case D 3, are naturally fractured flints, collected and shown from the resemblance which they bear *in outline* to the implements fashioned by human art.

Model of Pit-Dwellings near Salisbury.

In Case A 61 is a model of the first group of pit-dwellings discovered at Highfield, near Salisbury;† scale an inch and a half to the foot. The part marked "Disturbed soil" had been trenched; the white indicates undisturbed chalk; the yellow, undisturbed gravel. In the same Case is a model of some pits, found near Quimper, in Britanny, shown for comparison. This last model is to the scale of an inch to four feet.

* Evans, 'On the Forgery of Antiquities,' 'Trans. Royal Institution,' Feb. 24, 1865.

† See pages 57–68.

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